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THE IMPORTANCE AND PREVENTION OF RESPIRATORY RESTRICTION DURING GENERAL ANESTHESIA IN THE INHALATION METHODS.

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In a previous article I mentioned the practical importance of maintaining an unobstructed respiration during general anesthesia and means for procuring it[1], and have since called attention to the same matter, especially emphasizing its importance in connection with the administration of nitrous oxid.[2] After more extended observation I am very firmly convinced that respiratory restriction and the consequent increased respiratory effort is not only often an important factor in devitalizing the patient, but may produce serious circulatory effect as well, and that it often acts in such an insidious manner that it escapes detection.

In order to understand fully the ultimate results let us briefly review some of the essentials pertaining to respiration, with which we are most concerned. As regards size, the lower part of the respiratory tract is largely a reservoir, and of such a size that any reasonable increase in the pulmonary ventilation would not be affected thereby. The upper part of the respiratory tract, as far as size is concerned, is chiefly for conduction, with its anatomical parts so disposed that all of the respired current comes in intimate contact with the mucous surfaces which it passes. Indeed, in the upper respiratory tract a growth of only small size, or slight constricting deviation from the normal, materially interferes with normal pulmonary ventilation. The normal pulmonary ventilation of the adult is, roughly speaking, two gallons per minute, and the caliber of the upper tract is designed upon that amount of free respiratory movement. Nitrous oxid exerts a decidedly respiratory stimulant action and the pulmonary ventilation under its influence is practically double the normal, or, roughly speaking, it averages four gallons per minute.[2] Under ether, during the induction and light anesthesia, pulmonary ventilation is greatly increased, while under a moderately deep anesthesia of some minutes' duration it is about normal, and under deep anesthesia it is subnormal. Pulmonary ventilation under ether, therefore, varies much more according to the depth of anesthesia than under nitrous oxid. The difference in pulmonary ventilation under these two anesthetics is a very practical matter, and is not given the consideration its importance demands. The patency of the upper air passages, permitting a free normal respiratory movement under normal conditions, is much lessened by the inhalation of either of these anesthetics on account of the swelling caused in the component tissues, increased secretion of mucus, etc. In addition to the swelling, the tongue often drops backward and downward, and by its abnormal position further restricts pulmonary ventilation. What was formerly a normal air passage becomes, during anesthesia with these agents, abnormally small, and, at the same time, the demand for a free breathing space is materially increased except under deep ether anesthesia.

Let us next consider the physiologic phenomena that follow these conditions, first in connection with the administration of nitrous oxid. The demand upon the upper air passages is double the normal, while the breathing space soon becomes abnormally small, and continues to decrease gradually, as the tissues become more congested, and perhaps the tongue assumes an obstructing position. In many cases this respiratory restriction develops insidiously; cyanosis is prevented by gradually increasing the supply of oxygen. As the obstruction continues to develop, pulmonary ventilation is decreased accordingly; the respiratory movement that should be four gallons per minute, has been, more or less, gradually restricted to two gallons per minute; yet the anesthetist who is familiar with ether administration, but not so well versed in that of nitrous oxid, sees nothing wrong, as the patient is breathing well—about the same pulmonary ventilation as occurs under ether at this stage. The surgeon, likewise, sees nothing wrong, as the respiratory movements are occurring regularly and with force, and the blood is well oxygenated, thanks to the supply of pure oxygen which is now used a little more freely. During all of this

time the impulses going to the respiratory center are for four gallons per minute pulmonary ventilation, but the breathing space allows a passage of only two gallons per minute. This restricted pulmonary ventilation causes an accumulation of carbon dioxid in the blood and tissues, and accordingly impulses additional to the four gallons per minute demand are going to the respiratory center. This is worse than whipping the proverbial tired horse; it is whipping a tired horse and, at the same time, hobbling his feet so that he must go slower instead of faster.

The above is not so imaginary as it seems, for it is occurring unnoticed in many operating rooms daily. The most deceptive part is that when pulmonary ventilation under nitrous oxid becomes about that of the normal, or about that of a deep ether anesthesia, it is very much subnormal for nitrous oxid, and if it is caused by a respiratory obstruction, the patient is directly devitalized by the resulting injury to the respiratory center and the increased burden thrown upon the heart, notwithstanding the fact that the blood may be well oxygenated, for one of the chief aids to circulation is proper pulmonary ventilation. Whenever pulmonary ventilation is less than the corresponding respiratory effort, circulation is directly impeded. Second in importance only to keeping the blood well oxygenated is the constant maintenance of an unrestricted respiration. As a necessary corollary it follows that a high Trendelenburg position, which materially interferes with the respiratory movement, should not be used with patients having a defective circulatory system, for it must be constantly borne in mind that the pulmonary ventilation under nitrous oxid is double the normal. A low Trendelenburg position, however, does not usually produce any respiratory restriction.

The amount of oxygen required per hour to maintain a good color is indicative of the amount of respiratory restriction. A few years ago I used an apparatus that provided a constant flow of the gases, and a fair amount of rebreathing, and, at that time, I employed the usual means of preventing respiratory obstruction. The amount of gases used averaged 125 gallons per hour, and of this 25 gallons were of oxygen. For the past three years I have been using a special breathing tube to prevent respiratory restriction from obstruction in the upper air passages and while, during this same time, I have been using a different method of administration with more rebreathing, the amount of oxygen has averaged only 12 gallons per hour. It might seem that the lessened amount of oxygen was due to more rebreathing, but this evidently is not correct, for Connell, who also uses special tubes to prevent respiratory obstruction in the upper air passages, and uses practically the same total amount of gases that I formerly used, and, therefore, the same amount of rebreathing, reports that 10 or 12 gallons of oxygen per hour maintain a good color. This is the lowest effective amount of oxygen in prolonged administrations of any report that I know, and shows conclusively that when

obstruction in the upper air passages is prevented, the amount of oxygen required is considerably lessened. It is important to grasp the full import of these observations, for most patients do not *seem* to have any respiratory obstruction, and yet when an absolutely free breathing space is secured their respiratory movements become quieter, pulmonary ventilation is increased, and the amount of oxygen required is lessened. It is a sweeping statement, but practically all patients have respiratory obstruction during either nitrous oxid or ether anesthesia unless it is prevented by other than ordinary means.

The respiratory obstruction that occurs constantly under ether, even in the hands of the most skilled anesthetists, is well shown by the lessened amount of shock in the insufflation method, that is, where the ether is vaporized at some distance and blown to the patient, instead of being vaporized by the patient's respirations close to the face. Each of the writers on the several insufflation methods emphasizes the benefit of his own particular method to which he gives a distinctive name. It is much preferable to group these several methods under the general term *insufflation* method, and further classify each according to the place of terminating the efferent tubing, such as tracheal, pharyngeal, oral, nasal, facial, etc. This not only simplifies and clarifies the nomenclature, but also emphasizes the distinctive features of this general method, for all the writers report some observations in common to each of the subdivisions, and while these benefits vary in degree according to the particular subdivi-

sion, yet they are so prominent that they may be said to distinguish the insufflation method in general from the usual inhalation methods, viz: less irritation and congestion in the upper air passages, and consequently less respiratory restriction; a quieter respiration, less shock, and less post-anesthesia vomiting. This indicates very clearly that in ether anesthesia by the usual inhalation methods there is always more or less respiratory restriction, and consequently increased respiratory effort, which directly devitalizes the patient and contributes to shock.

The distinctive benefits of the insufflation method may be said to be based upon the following general principles: That of preventing or lessening obstruction in the upper respiratory tract, the degree depending upon the particular method; the delivery to the patient of a warm, moist vapor; and a constant, even administration. It is these principles, and not the individualized insufflation methods, therefore, that become matters of prime importance, for if the fundamental principles are understood, they may be applied in the inhalation methods as well, for while the endotracheal insufflation method possesses advantages that cannot be secured by any other method, the same cannot be said with the other insufflation methods. The vapor may be delivered to the patient warm, with the natural humidity of the air and at a constant rate of administration, without insufflation, as I have shown in the open, drop method of warm ether administration.[3] Respiratory obstruction, which is prevented by the insufflation method other than the endotracheal, may be prevented by securing a free artificial breathing space. The insufflation methods in general, and more particularly the endotracheal, have shown the distinct benefit of always maintaining an unrestricted respiration. When this principle is thoroughly recognized and applied, a smaller amount of the anesthetic will be administered, and the patient's physical condition materially benefited.

The best means I have found to prevent respiratory obstruction under nitrous oxid is the metal breathing tube herewith illustrated. Dr. Karl Connell, of New York City, was the first to suggest and to use a flat metal breathing tube, and this design is a modification of his original one. As soon as the patient is anesthetized the inner end of the tube is slipped between the teeth, back along the roof of the mouth, and over the base of the tongue. When in position the outer end projects slightly beyond the lips. This metal tube is also well adapted for use in connection with the administration of ether except when the usual open drop and allied methods are used. The metal projecting beyond the lips renders its use dangerous whenever there is a possibility of liquid ether coming in contact with it, for under these circumstances the metal tube might act as a conduit for the liquid ether to reach the patient's throat.

To prevent this same form of obstruction, Hewitt originally used an "artificial air-way" made of a straight rubber tube, with a metal fitting at the outer end to slip between the teeth and hold it in position.[4] This I improved some time ago by using a specially molded, curved rubber tube, with a metal fitting at the end. These, and similar designs, however, are open to the serious objection that in using the usual open ether mask the metal projecting beyond the lips may be the means of conducting liquid ether into the patient's pharynx. More recently I altered the design of the metal fitting on the curved rubber tube, as shown in the illustration, so that the exterior metal fits between the teeth and lips, thus leaving no projection whatever beyond the patient's lips. In this respect it differs essentially from all other mouth tubes, and can be safely used with the open ether mask. This rubber tube remains patulous, and at the same time it is sufficiently pliable to adapt itself to the varying anatomical requirements.

The success of the anesthetist depends largely upon attention to detail, and there is no important detail that has been more neglected, or that more graphically shows practical results, than the prevention of obstruction in the upper air passages.

HOTEL BRETTON HALL, 86TH STREET AND BROADWAY.

REFERENCES.

[1] "An Improved Breathing Tube," *New York Medical Journal*, August 17, 1912, p. 357.

[2] "Safety and Science in Nitrous Oxid Administration," *Medical Record*, November 2, 1912.

[3] "A New Apparatus for Administering and Warming General Anesthetics and New Methods of Administration," *Journal of the American Medical Association*, March 23, 1912. "A Scientific System of Administering Ether," *Medical Record*, May 4, 1912. "Warming Anesthetic Vapors Neither Useless nor Fallacious," *Medical Record*, March 1. 1913. "General Surgical Anesthesia," *Reference Handbook of the Medical Sciences*, 1913, Vol. 1, p. 363.

[4] Probyn-Williams: "A Practical Guide to the Administration of Anesthetics," 2nd ed., p. 41.

Do not apply a dressing that will cause pain or discomfort in an ulcer. The patient removes the dressing and consults another surgeon.

Painful nodules on the bone near the crest of the tibia should warn you of syphilis. If they do not soon yield to antisyphilitic treatment (and as a rule they don't), incise, scrape out, and dress antiseptically.—Bernays' Golden Rules of Surgery.

TECHNIC OF THE INTRA-ABDOMINAL ADMINISTRATION OF OXYGEN.

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During the Clinical Congress of Surgeons of North America, held in New York City in November, 1912, I operated upon fifty-four cases, and presented one hundred and twenty-seven additional patients showing features of especial interest. Among these were several which illustrated the intra-abdominal administration of oxygen, by the method first employed by me in 1903, and reported in 1908 and 1909.* Especial interest was manifested in these cases by the attending surgeons, and repeated requests were made for a description of the technic as now employed. In view of the continued successful use of oxygen by this method, of the interest manifested in this particular therapeutic use, and of the general awakening of the medical profession to the therapeutic value of the gas administered for different purposes and by different methods, it has seemed not amiss to briefly describe the intra-abdominal method as now employed.

The therapeutic value of oxygen was recognized almost immediately after the discovery of the gas, in 1773. It was not established upon a definite scientific basis, however, until within comparatively recent years. In a previous communication (1), I traced the evolution of oxygen therapy, as utilized in the treatment of various conditions and by different methods. It is not the purpose of this communication to refer to the uses of the gas by other methods than intra-abdominal introduction.

In abdominal surgery and gynecology, two methods of administration have been employed:

(1) By *continuous current*, as first described by Thiriar in 1899, used by Javaux and others during the early years of the last decade, and latterly, with modifications, by Arnaud, * Ramond,** and others.

In the continuous administration, as suggested by Thiriar, and employed by him in tuberculous peritonitis, the ascitic fluid is first evacuated through a button-hole incision, the oxygen being then sent into the cavity in a continuous stream for ten minutes, a free outlet being maintained.

The gas was also used by Thiriar and his followers for flushing out the abdominal cavity after laparotomies. The application of oxygen in this manner is made with the object of stimulating the tissues, preventing the extension of the inflammation, causing increased phagocytosis, destroying the germs or diminshing their virulence, neutralizing their toxins, and "substituting an oxygenated emphysema for the microbian emphysema."

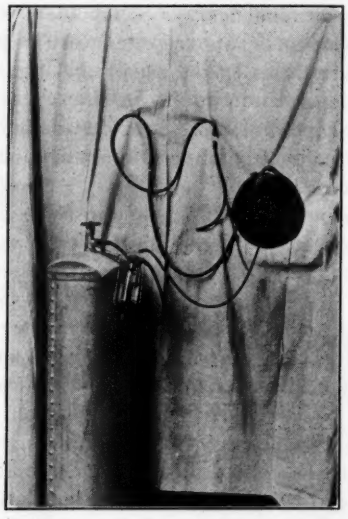

Fig. 1.—(1) Oxygen tank. (2) Wash-bottle. (3) Rubber tubing.

In the cases recently reported by Arnaud, the injections were repeated three times a day, in one case (30 liters at the time), and twice a day in the second case (50 liters per injection), while in the third case a continuous current (600 liters) for 36 hours, was employed.

Fig. 2.—(1) Oxygen tank. (2) Wash-bottle. (3) Rubber tubing coiled in pan of hot water.

(2) *By injection into the peritoneal cavity,* with *immediate closure of the abdomen,* and *gradual absorption of the gas.*

In this method, which I have employed since

*(1) Bainbridge,—Oxygen in Medicine and Surgery—A Contribution, with Report of Cases.—*New York State Jour. of Med.*, June, 1908.

(2) Bainbridge—The Intra-Abdominal Administration of Oxygen,—A Further Contribution, with Reports of Additional Cases.—*Annals of Surgery*, March, 1909.

(3) Meeker,—The Intra-Abdominal Injection of Oxygen as Studied in Animals. Report of Cases in the Human Subject.—*New York Med. Jour.*, April 10, 1909.

*Arnaud,—Intraperitoneal Injection of Oxygen in the Treatment of Acute Diffuse Peritonitis.—*Lyon Chir.*, 1912, VII, p. 411. See also: Abstract of Arnaud's paper in *Surg., Gyn. and Obst.*, February, 1913, p. 23.

**Ramond,—Indications and Technique of Oxygen Injection.—*J. d. Med.*, Paris, 1912, XXXII, October.

1903, there is no repetition of the injection, nor is there a continuance of the current. The gas is merely introduced into the abdominal cavity, with greater or less degree of distention, according to circumstances, with immediate closure of the abdominal wound, the gas being left *in situ* to be gradually absorbed.

The experimental investigations by which our clinical observations and deductions were verified, were conducted for the purpose, specifically, of determining the following points:

(1) The absorbability of oxygen.

(2) The effects of oxygen upon (a) blood-pressure, (b) pulse, (c) respiration, (d) degree of anesthesia, (e) time of recovery after anesthesia.

(3) The comparative effects upon the above when oxygen is employed and when air is employed.

(4) The danger point of intra-abdominal pressure as manifested by a fall in blood-pressure, respiratory embarrassment, and cardiac failure.

Fig. 3.—Passing of oxygen from tank into abdominal cavity.

(5) The effect of oxygen upon adhesions in the abdominal cavity.

From the experiments the following deductions were made:

(1) Oxygen is completely absorbed in the abdominal cavity. (2) It is a slight respiratory stimulant. (3) It is a slight cardiac stimulant. (4) It has but little effect on blood-pressure when the pressure of the gas is moderate. (5) It tends to bring an animal quickly from deep anesthesia. (6) It hastens the recovery of an animal after discontinuance of the anesthetic. (7) A pressure of more than 2,500 mm. of water may cause collapse. (8) Oxygen tends to prevent the formation of adhesions. (9) It quickly changes a dark blood to a scarlet in cases of anoxemia. (10) It stimulates intestinal peristalsis. (11) It is not an irritant to the peritoneum or abdominal viscera.

The purposes for which oxygen is administered intra-abdominally are as follows:

(1) To lessen shock, nausea, and vomiting.

(2) To overcome negative intra-abdominal pressure after removal of large tumors.

(3) To prevent the formation of adhesions.

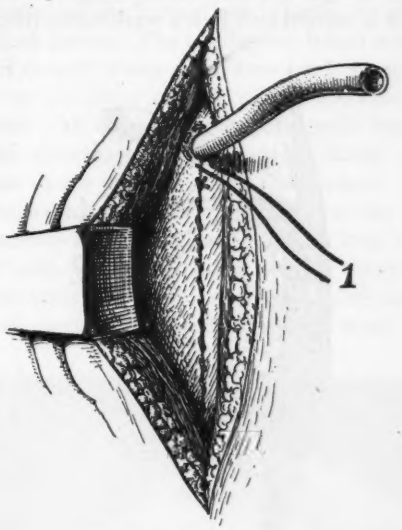

Fig. 4.—(1) Showing suturing of peritoneum; continuous stitch to inserted tube, purse-string stitch encircling tube.

(4) For its effects upon tuberculous peritonitis of certain types.

(5) For its effect upon pus-producing organisms and their toxins.

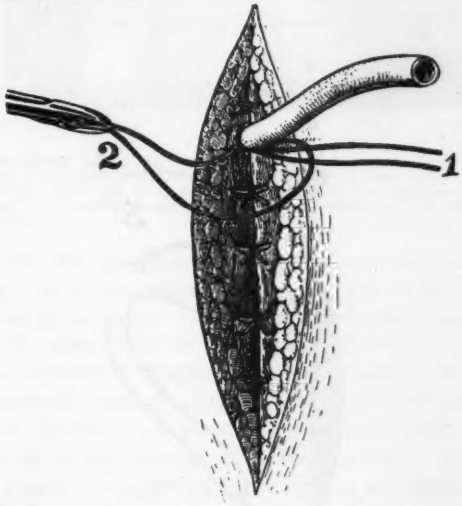

Fig. 5.—Aponeurosis united with interrupted sutures, the muscle having been previously sutured. (1) Untied ends of peritoneal purse-string. (2) Untied suture through aponeurosis, passing half way around tube.

The oxygen employed for these purposes must, naturally, be as nearly "pure" as it is possible to obtain. The gas which I have employed for a number of years, has been shown, by careful analysis, to contain from 94.3 per cent. to 97 per cent. oxygen; 2.37 per cent. to 4.5 per cent nitrogen; a

trace of carbon dioxid; no chlorin; no nitrous oxid.

The gas is warmed, usually to a temperature of from 90° to 100° F. This is accomplished by passing it through a rubber tube from the tank in which it is compressed into a wash-bottle filled with

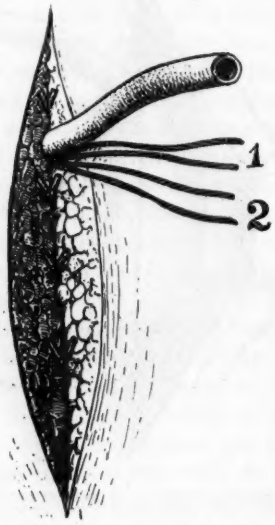

Fig. 6.—Superficial fascia united. (1) Untied peritoneal purse-string. (2) Untied aponeurosis suture.

hot water. From this bottle the partially warmed gas passes through the exit tube, which is coiled in a basin of hot water. This long exit tube is again

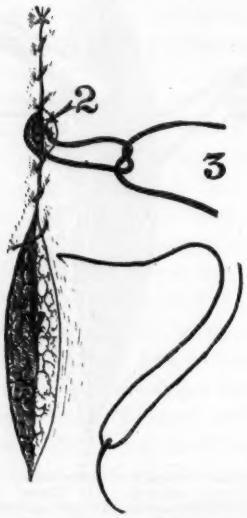

Fig. 7.—Tube withdrawn. (2) Peritoneal purse-string tied, knot beneath aponeurosis. (3) Aponeurosis suture. Figure illustrates practicability of placing skin stitches while tube remains in the abdomen.

connected to a piece of glass tubing, and to this, in turn, is attached a piece of sterile rubber tubing through which the gas is introduced into the abdominal cavity. (Figs. 1, 2 and 3.)

The technic of closing the wound and withdrawing the rubber tube is shown in figs. 4, 5, 6 and 7.

The amount of oxygen to be administered depends upon the exigencies of the case. Where there is abdominal distention from ascites or tumor the girth of the abdomen should be measured before operation, and after removal of the fluid or the tumor, the abdomen should be distended to the same or perhaps a little less degree by the admission of oxygen. In the case of shock, hemorrhage, etc., a crude, yet practical, test in the average case is found by first determining that the liver is not adherent to the chest wall and is of approximately normal size, then administering enough oxygen to obliterate liver dulness.

The abdominal wound is closed, except at the lower or upper end, as the case may be, where the free end of the tube is placed within the abdominal cavity. One stitch is introduced above and one below the tube, and these are tied. An interrupted stitch is placed in the peritoneum at this point, ready to be tied, and a purse-string suture is introduced around the tube in the peritoneum, left long but not tied. All layers of the abdominal wall are closed, up to the skin, and the stitches tied, with the exception of those in juxtaposition to the tube. These, layer by layer, are tied after the purse-string stitch has been fastened.

When the desired amount of gas has been introduced the tube is carefully withdrawn and the purse-string stitch tied, all the others being fastened layer by layer. Care should be taken of course, to prevent intracellular emphysema, which, while not harmful, may be a source of some discomfort to the patient.

I have used oxygen by the method described in more than 125 laparotomies, with uniformly favorable results. Experience continues to verify my earlier contention that oxygen, intra-abdominally administered, has a distinct field of usefulness in lessening shock, nausea, and vomiting; in overcoming negative intra-abdominal pressure after removal of large tumors; in tending to prevent the formation of adhesions, or, when adhesions have been broken up, lessening the liability of their return; in influencing favorably certain types of tuberculous peritonitis; and in exerting a beneficial effect upon septic peritonitis.

34 Gramercy Park.

Don't forget the favorite site for gummata (cutaneous and subcutaneous)—the outer side of the leg near the knee.

Never massage a limb in which there are varicose veins without being sure that no phlebitis is present.—Bernay's Golden Rules of Surgery.

CANCER OF THE BREAST.
A FURTHER CONSIDERATION OF ITS CHEMIC EXTIRPATION.*

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Passing over the text-book classifications and descriptions of cancer of the breast familiar enough to all I shall plunge at once into the very heart of my theme and say a few words on its pathogenesis and treatment, as this alone will easily occupy all the time allotted to me. Moreover, I can say nothing new on the subject except to report some personal convictions based upon actual experiences and observations, and to demonstrate some of the results.

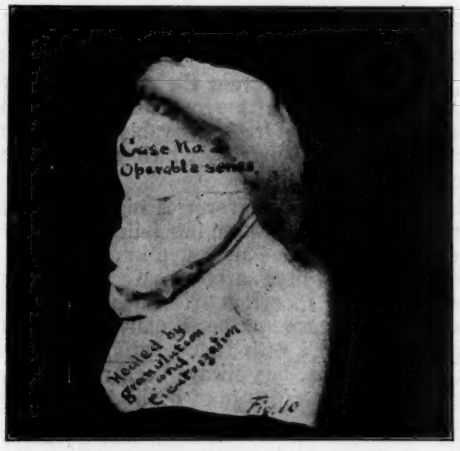

FIG. 1.

Case No. 2. Operable Series. Operated upon by the author's chemical method, and healed by cicatrization.

FIG. 2.

Photograph of the same case as "No. 2 of the Operable Series." (See foregoing reproduced illustrations.) Taken June 20th, 1913; six years and three months subsequent to the removal of the breast by the author's chemical method; showing well the present condition.

Broadly speaking, the rational treatment of cancer in any form is, and will continue to be, surgical until the advent of a serum derived from its causative pathogenic germ. The rational surgical treatment of all forms of cancer should, so far as practicable, proceed upon the assumption that a wound freshly made in tissues adjacent to any cancerous focus is a wound almost invariably *swarming* (82½% of all cases) with pathogenic germ-infected cells. Further, that these specific germs—both within and without the cells—are most powerfully active, virulent and tenacious, in the presence of so favorable a culture medium as the living traumatized tissues of man; requiring nothing less than *total* eradication at the time of operation to remove from the patient the very real danger of recurrence. We find it increasingly difficult to believe that this so vital complete eradication can, with any degree of uniformity or certainty be accomplished by the method so universally in vogue. Far from it! Our failure thus far to deal successfully with this greatest scourge of the human race is known to all lands, and in all places. The intelligence which wields the scalpel cannot in any given case, with absolute certainty or precision remove *all* the diseased tissue, together with *all* the specific pathogenic organisms, nor *all* the struggling tail ends of tumor strands, because of *the manner of the traumatism.*

Traumatism I grant there must be in any method of removal of the cancerous breast, but, as compared with rapid extirpation with its uncertainties, and the utter lack of preparedness or defense on the part of contiguous structures,—what about a traumatism that proceeds so leisurely from without inward as to accomplish the destruction, in situ, of all infected tissues, coincidentally affording nature ample opportunity to "wall off" and establish her own defenses by phagocytosis; two powerful forces co-operating and assuring for the infective organism silent, insidious, unescapable annihilation; and this without at any time severing the continuity of living tissues, i. e., opening fresh avenues of infection? Such is chemic surgery,—the *new* chemic surgery, (for the use of caustics in cancer is as old as the history of medicine, and has long been relegated to quackdom because of its unscientific employment). The *new* chemic surgery is along *purely scientific lines,* and is a powerful rival for surgical honors as against the present standard operation.

Let us compare a few of the advantages and disadvantages of the two methods,—i. e.,

* Read by invitation at the annual meeting of the Connecticut River Valley Medical Association, May 13th, 1913.

Rapid Extirpation vs. Chemic Extirpation

All rapid extirpations, like the Halsted operation —favor reinfection and recurrence. Rapid extirpation has 62½% of recurrences within three years to its credit, in presumably "preferred" cases, as reported during the past decade by thirteen of our best surgeons. (See article, *Amer. Jour. Surg.*, Nov. 1912.)

Rapid extirpation cannot always be employed in that large class of advanced cases, presenting broken-down conditions with coincident internal metastases.

Rapid extirpation must always be done under full chloroform or ether or gas anesthesia, and involves severe shock to the nerve centers.

Rapid extirpation traumatizes the remaining adjacent skin in various ways to cover defects, and for drainage purposes. This becomes apparent in recurrent cases in the appearance of nodules at the various sites of such traumatisms, more especially along the lines of incision and suture.

Rapid extirpation makes no provision in its program for recurrence, as it ablates to the limit all suspected tissues at the primary operation, and when recurrence comes, falls back upon reexcision and *x*-radiation, neither of which is effectual, as a rule.

Rapid extirpation knows no way of securing a pathological speciment for diagnosis in a suspicious case at any stage, *without exposing the patient to the danger of the open wound;* a danger which all surgeons freely admit.

Rapid extirpation always requires the most extensive and complete removal of all enlarged axillary glands on the generally conceded assumption or ground, that all such enlarged glands are cancerous.

Chemic extirpation absolutely does not favor recurrence.

I confidently predict for my chemic method a reduction of these discouraging statistics to 10% or less for the same period, *in the same class of "preferred" cases.*

The chemic operation on the contrary may be employed in all these cases alike—being at all stages safe, insuring a longer subsequent lease of life and increasing the possibility of permanent cure fully 50%.

The chemic operation, on the other hand, may, if desired, be begun, continued and ended *without* their use and with practically no pain or appreciable shock.

Chemic extirpation obviates all this, requires no punctures, stabs, tension or other sutures, in any way, and eventually covers the finely granulating surface with skin grafts from the thigh. These grafts soon insure a freely movable and normally functionating skin surface, which remains unaffected by recurrence.

Chemic extirpation however is highly competent when the standard operation has failed as evidenced by recurrence to immediately step in and "land" the patient "high and dry," after a safe and extensive destruction of the recurrent area, such as the scalpel alone could not accomplish. Finally it covers this granulating surface with functionating skin grafts, thus changing what has always been regarded as a badge of death, to a picture of health, and herald of hope.

Chemic surgery in doubtful non-cystic cases, proceeds with the removal of the tumor itself to the point where a specimen for diagnostic purposes can be obtained, following examination of which *either radical extirpation of the entire breast is at once proceeded with, or, the operation concludes then and there with the local removal of the growth*—as the case may be. (Notation:—A pathological diagnosis of such removed tumor tissues may be made with about the same facility as in the perfectly fresh specimen. Old broken down or far advanced cases present somewhat greater difficulties in this respect. However, in such cases a corroborative diagnosis is not required.)

Chemic extirpation does not include the removal of all such enlarged axillary glands, it having developed in the course of the pioneer work that *they subside and resume their normal function.* Why this is so cannot yet be definitely stated. The most plausible view is that a *sufficient proportion of the active agents employed in the devitalization is absorbed by the lymphatics, and thus destroys the cancerous elements lodged therein—these glands thereafter undergoing resolution.* For many reasons this may easily be the solution, as it explains among other things the melting away of glands frankly cancerous and far advanced beyond the stage of a possible benign pre-metastatic enlargement.

In well advanced cases with septic absorption, the coincident intravenous employment of arsenical preparations;—the iodides and chlorides generally;—and, more particularly, the use of iodoform in ether, as adjuvant treatment, is under observation, and bids fair to prove of definite value.

The technic of chemic extirpation of the cancerous breast has been, and still is, undergoing important modifications. Radical chemical extirpation of the cancerous breast is a most deliberate procedure, requiring patience, and a thorough knowledge of details, and would best not be undertaken without special training. Also it is pertinent to say that such cases should be treated in a specially equipped institution.

FIG. 3.

Naturally the question uppermost in our minds at this moment is,—what are the clinical results? Anticipating this I have much pleasure in presenting Mrs. B., who has consented to a demonstration. Mrs. B.'s is one of the seven pioneer cases reported in the AMERICAN JOURNAL OF SURGERY: Nov. 1912.

Quoting from that report: "March 20, 1907, Mrs. B., American, age 45, mullipara; carcinoma of left breast size of small hen's egg. Lancinating pains for months; retracted nipple, tumor adherent; enlarged lymphatics. Had been *x*-rayed for three months. No material progress; began enlarging again. The modified chemical operation was done. Lymphatics disappeared, and healing took place quite rapidly . . . The aponeurosis of the pectoralis major was removed." I am here presenting the same case six years and two months after the operation. You will note that the patient is in fine physical condition and appears perfectly well. Also that the operated site is covered with a soft, white, movable, perfectly flexible, cicatricial substitute for the normal skin. This being next to the earliest case, the skin grafting idea had not suggested itself. Much dryness and discomfort follows this method of closure resulting from lack of the natural glandular secretions. As a result closure by skin grafting is now an essential part of the present technic, and assures an ideal result in every way.

An interesting coincidence in relation to the above case may with fairness be cited here to illustrate the striking advantage of the new over the old or standard operation. At about the same time that Mrs. B. began having her *x*-ray treatments another patient, whose name shall be Mrs. X, came, also with an indurated irregular tumor of fair size in her left breast, having all the earmarks of carcinoma. Mrs. X., a multipara whose age was 32, (13 years younger than Mrs. B.) was in good physical condition, and even rosy cheeked, feeling fine, and was working every day at a local bakery. Side by side almost, figuratively speaking, these two women underwent, for three months, the same degree of *x*-raying. In each on four separate occasions a good therapeutic *x*-ray dermatitis was produced. In each the tumor and symptoms had diminished, and in each one also at about the end of the third months of treatment the growth and axillary glands began again to enlarge, coincidently with the return of pressure symptoms. At this point treatment was abandoned and the alternative presented to both patients, of either the radical Halsted excision, or the chemical devitalization of the author. Mrs. B. chose the latter, with the foregoing results; while Mrs. X. disappeared, and as I later learned, had gone to Burlington, Vt., where she had undergone the radical Halsted operation. Several months later I learned that there was recurrence, and nine months from the time of operation news came that Mrs. X. had died of recurrent carcinoma.

In connection with the specific cancer germ question, those interested should be familiar with the recently published work of Prof. Irwin F. Smith, Plant Pathologist, U. S. Bureau of Agriculture, Washington, D. C. Prof. Smith has discovered the specific plant cancer microorganism (bacterium tumefaciens). Those so inclined will do well to send to Prof. Smith for a reprint of his article "On some resemblances of Crown Gall to Human Cancer," also bulletins No. 213 and No. 255. These bulletins beautifully illustrate this important work. Prof. Smith was able to obtain, in rapidly growing young plants 100 per cent. of infections, with the speedy production of plant carcinoma.

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DISEASES OF JOINTS AND BONE MARROW.

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DISEASES OF THE SHAFTS.

ACUTE OSTEOMYELITIS OR MYELOPERIOSTEITIS.

As in other organs of the body, so in the bone, an inflammation may be caused by a number of different infectious agents, and in the shafts the principal infective agents are the pus cocci-staphylococcus and streptococcus—typhoid bacillus, and the treponema pallidium of syphilis. Hence we find the disease occurring as a metastasis from an unknown focus of infection, and as the result of compound fractures, etc., as a complication of typhoid and as a manifestation of syphilis. Uncomplicated tuberculosis is said to occur in the shafts of children's bones only, and is extremely rare. The fatty marrow of the adult bone affords no field for invasion by the tubercle bacillus. Some authorities maintain that the gonococcus may cause an osteomyelitis. I believe that this is correct. A pus infection may be grafted on other forms of bone marrow infection. A secondary infection of a tuberculous arthritis permits an extension of the disease to the shaft marrow also.

SUPPURATIVE OSTEOMYELITIS, OR SUPPURATIVE MYELO-PERIOSTEITIS.

This form of inflammation of the marrow and of the inner layer of the periosteum usually goes by the name of acute infectious osteomyelitis, but the term is not descriptive, for a myelitis or periosteitis caused by the typhoid bacillus, by the gonococcus, or by the tubercle bacillus is infectious also.

The cause has already been mentioned. The staphylococcus pyogenes aureus is the usual infective agent, more rarely the streptococcus and the staphylococcus-pyogenes albus. The disease occurs most frequently in children and adolescents. Trauma and chilling of the surface have been said to predispose. The acute infectious diseases, which frequently precede an arthritis, may precede a myelitis of the shaft above.

PATHOLOGY (1).

The essential features of an inflammation of the marrow of the shafts are much the same as those of an inflammation of the marrow of the ends of the long bones. The results are modified by the structure of the bony and periosteal envelope of the diseased marrow and represent the solution of a mechanical problem.

In the more common form (the diffuse) the original focus usually forms in the marrow of the metaphysis (most often of the femur, tibia or humerus) near the epiphyseal line, and spreads in the meshes of the spongy bone until it reaches the large central marrow canal, the marrow compartments of which communicate freely with one another. The disease spreads, in other words, in the direction of least resistance, for the epiphyseal cartilage offers a barrier to its progress toward the joint. Streptococcic myelitis is said to involve the joint oftener than staphylococcic.

According to some writers the start of the process in a large proportion of the cases is in the marrow of the central canal.

The violent inflammation kills the marrow tissue, which breaks down, and the bone, deprived of its nutrition, dies also. Pus forms. The process spreads through the marrow canals in the cortical bone and involves the deep layer of the periosteum.

1.
Acute suppurative osteomyelitis, diffuse form, in a boy of 7.

Pus forms here also, raising up the periosteal membrane off the bone, and running along beneath it. Coincident with all this the disease may have sought the surface of the bone in the metaphysis, made its way through the thin, dense layer of bone and, gaining the under layer of the periosteum, may have spread along shaftwards. In its typical and well developed expression the morbid process results in the death of the bone from one epiphysis to the other, and the dead shaft lies bathed in the broken-down and suppurating marrow and inner layer of the periosteum, the dense outer layer of the periosteum enclosing the whole in a firm envelope, preventing the exit of the pus, and thus adding to the severity and destructiveness of the inflammation. The cortical bone of the shaft also serves to bottle up the inflammatory products in the

central canal in spite of the minute marrow canals running through it, and thus helps the spread along the central canal.

The pus may make its way through the cortical bone and periosteum and gain the surface, but in the severer cases, unless artificial aid is rendered, death from septic absorption may take place before this is possible.

When an operation is undertaken in the early stage, the incision through the periosteum opens up the abscess beneath it. The bone has lost its connection with the periosteum, and exudes pus through the minute openings on its surface. If the bone be trephined, the central canal will be found full of pus, containing fat droplets that give it an oily appearance.

The complete and typical course is by no means invariable. The inflammation may spread along

2.
Acute suppurative osteomyelitis, in the stage of repair (Osgood).

under the periosteum and kill a portion of the cortical bone, possibly never invading the central canal, or it may involve a section of the central marrow canal and shaft, and leave the rest uninvaded. In this case the healthy end of the bone is wont to be walled off from the diseased end by a mass of dense bone.

The neighboring joint may be the seat of a serous exudate. In some instances the inflammation may make its way into the joint, causing a suppurative arthritis.

Under the microscope the marrow is seen to be the seat of an intense inflammation, and contains nests of pus cocci, abscesses, areas of round cell infiltration, etc. In places the marrow undergoes a fibrous change.

[1] See also E. H. Nichols, *Journal of the American Medical Association*, 1904, XLII, 439.

As the disease spreads, the bone trabeculæ in places show productive, in places rarefying inflammation. Many of them are dead. Some of the dead trabeculæ in the less active cases are lined by osteoid tissue, showing the effort of the still living marrow to repair the damage done. When the morbid process has run its course, then all signs of activity cease in the dead structures.

When an acute purulent inflammation has run its course in the soft tissues, healing is accomplished by a filling of scar tissue, but in osteomyelitis this is impossible. Whether the pus have been let out with a knife, or whether spontaneous discharge have taken place, the piece of necrotic bone shaft lies in its fibrous periosteal envelope, with which it may be adherent in places, attached at one

3.
Acute suppurative osteomyelitis, circumscribed form (Osgood).

or both ends to living bone. In time nature will separate the dead from the living bone, but if the destruction have been extensive, the dead sequestrum cannot be thrown off through the comparatively small openings in the periosteum, but remains indefinitely locked up in a shell of new bone (the involucrum) built up around it by the activity of the inner layer of the periosteum. This is the so-called chronic stage of osteomyelitis, but in point of fact there is no active marrow inflammation. The disease has run its course, and the wound is prevented from healing by a mechanical obstruction.

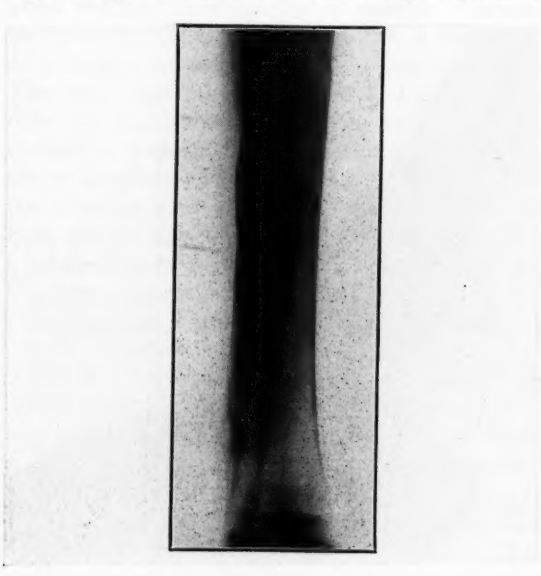
CIRCUMSCRIBED FORM.

Another form of the disease occurs which shows little tendency to spread far, or to do much damage. The focus is located as a rule near the epi-

physes. The bone breaks down in a small area, and around this area the bone may be enormously thickened. The course may be rapid or very slow. Sometimes the collection of pus may remain for a long time. According to Klemm [1] many cases of chronic arthritis are due to circumscribed suppurative osteomyelitis in the bone end.

SYMTOMATOLOGY

The onset of an acute suppurative osteomyelitis is usually sudden, with chill, fever, etc. Pain is an early and constant symptom, and is very severe. It has been described as "boring." Sensitiveness of the affected bone to pressure is extreme, and the location of this sensitiveness is wont to be in the neighborhood of a joint, but not in the joint itself. Reddening of the skin. and edema may be present,



4.
Syphilitic myelo-periosteitis, hereditary.

and the edema may involve the portion of the limb distal to the diseased area. Fluctuation can rarely be elicited in the early stages. Even after the process has spread up into the central marrow canal, the physical signs may still be most severe in the metaphysis. Delirium, extreme prostration and marked constitutional involvement may be early signs. A leucocytosis is the rule.

The Roentgen rays in the earliest stages will probably show no characteristic changes. Later in the course of the disease, they are of great assistance in determining the extent of the destructive process. The dead bone is more permeable, and shows as dark areas on the plate.

The circumscribed form is not so severe as the diffuse. It also starts in the metaphysis, but does not spread up into the shaft. It may be rapid in its course, or very slow, lasting for years. The latter class is characterized by more or less pain and sensitiveness, which may be intermittent. The neighboring joint may show evidences of inflammation.

The Roentgen rays are one of the most valuable means of diagnosis in all these circumscribed cases. They will often show the cavity near the end of the bone, possibly with thickened walls.

DIAGNOSIS.

In the very early stages, suppurative osteomyelitis might be confused with a joint inflammation—"rheumatic" or other—but, while the patient is most eager to keep the limb quiet, motion in the neighboring joint is but slightly restricted. The edema of the limb is characteristic.

Tuberculous inflammation of the shaft marrow

5.
Paget's Deforming Osteomyelitis. Photomicrograph of section of femur near marrow canal. A. Osteoid tissue. B. Osteoid tissue (Ellis).

is very rare, and is decidedly slower in its course.

Syphilis, typhoid and gonorrheal marrow inflammations are not so distinctive, nor so rapid, nor is the constitutional involvement so severe, as in suppurative myelitis.

If we will steer clear of the error of calling any deep-seated disease in the extremities "rheumatism" and dosing the patient with salicylates as a routine measure, we shall usually not be very long in reaching a correct diagnosis.

The thickened shaft, the discharging sinuses, etc., make the later stages quite plain.

PROGNOSIS.

This is usually good if the disease be recognized early, and if proper treatment be carried out, bad otherwise. Death may quickly result from septi-

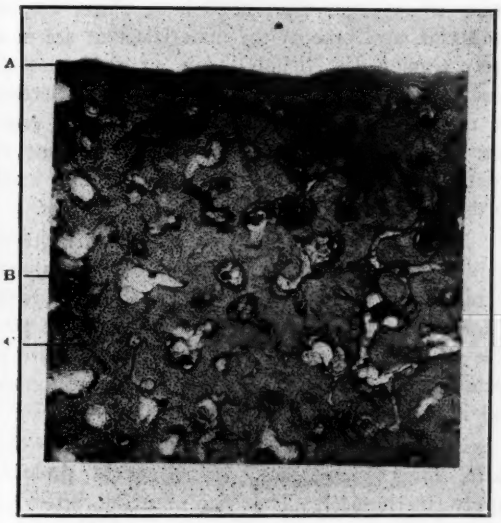
[1] Klemm, *Archiv fur Klinische Chirurgie*, February, 1912.

cemia. The mechanical obstructions to healing caused by the presence of dead bone or by Nature's unaided efforts to repair the damage, may result in a suppurating cavity that may persist for years. The dense eburnated bone walling off the diseased area from the rest of the shaft may prevent normal bone production, and the union of the two ends of the bone. Two eburnated bone ends seldom if ever unite spontaneously, probably because they are practically without marrow. Nichols maintains that if the sequestrum be allowed to remain too long the periosteal bone is incapable of filling the gap.

TREATMENT.

For the circumscribed forms, incision and drainage constitute the best treatment.

For the diffuse form incision and drainage are



6.

Paget's Osteomyelitis. Photomicrograph of the femur at the surface. A. Periosteum. B. Connective tissue containing giant cells. C. Cellular osteoid tissue (Ellis).

our first care also, but here we must remember that when we have incised the periosteum and have let out a collection of pus under it, our task, except in the most superficial cases, is only begun. We must follow the infection as far as it has gone, and must drain, not only the superficial bone, but the central canal. The periosteum should be slit up as far as it is stripped from the bone. Wherever the periosteum is loosened we are justified in assuming the death of at least the superficial layer of the bone cortex.

The next step is to ascertain the condition of the marrow of the central canal. If this is infected, and it usually is, it must obviously be drained. With a hammer and chisel an opening is made. If pus be found, the opening is enlarged longitudinally until the limits of the disease are reached, by removing a strip of the cortex a quarter to a half an inch wide. Some authorities recommend scraping out the diseased marrow, some condemn the procedure. It is apparently unnecessary. The curette has little place in bone surgery. Bone scraping is, at best, a poor operation.

Theoretically the dead bone should be removed, but most authorities condemn this procedure. Le Conte [1] maintains that if this operation be undertaken within 96 hours after the onset of the disease, it should be possible to remove all the dead bone and obviate absolutely the necessity of a later operation. His position seems quite logical, and his example is well worth following.

To guard against the too early closure of the wound, we sew the skin to the periosteum or to

7.

Photomicrograph of section of skull, near inner surface. A. Loose connective tissue. B. Osteoid tissue, slightly fibrillated (Ellis).

the deep fascia, pack the wound with sterile gauze and apply our dressing.

As a rule, the symptoms abate as soon as the pus has been evacuated, and after a few days the patient returns to a state approximating health.

The almost universal rule has prevailed to abstain from further interference until nature has loosened the dead piece of bone, and has accomplished all that was possible, but Nichols [2] has demonstrated rather conclusively that this is an error. Not only does the dead shaft or fragment adhere to the periosteum in places for long periods, but also the presence of the large sequestrum causes, as we have seen, an eburnation of the ends of the "box" of new bone in which it eventually

[1] Le Conte, *Annals of Surgery*, 1912, LVI, 150.
[2] Nichols, Loc. cit.

comes to lie. The new periosteal bone formation may be quite active, and may result in a thick shell at the circumference of the new shaft, but when the sequestrum is removed, the periosteum is quite unable to bridge in the gap in the interior, and a suppurating wound may remain for years.

For this reason Nichols recommends that the sequestrum be left in its place just long enough to provide for the laying down by the periosteum of sufficient new bone to hold the limb in shape after the sequestrum is removed. This period is roughly eight weeks in the case of a bone that has a companion parallel bone, such as the tibia and radius, and sixteen weeks in other bones. In the former class, the thickness of the new periosteal bone is determined, not only by radiograms, but by thrusting a needle through the periosteum near the opening of the sinus. If the bone crackles like an egg shell when the needle passes through it, it is strong enough to justify the removal of the sequestrum.

Through an incision in the periosteum the dead bone is laid bare along its entire extent. Dead bone is dead-white or dirty gray or yellowish, and does not bleed through its minute "pores" when the periosteum is stripped off. If the periosteum be adherent in places, it is separated, and the dead shaft or portion of shaft is removed, by grasping it with a pair of forceps and twisting it out. If it be still attached at its ends to the viable portion of the shaft, it may be chiseled away.

The divided edges of the periosteum are then sewn together for most of their extent, leaving an opening for drainage.

If one elects to follow the older methods, one allows enough time for the dead bone to become loosened—six months to a year—and then, chiseling a hole in the dense involucrum, inserts forceps, and twists the sequestrum out. As a rule the shaft reforms, and the wound slowly heals.

The treatment of osteomyelitis following compound fractures consists in early incision and drainage, followed some time later by the removal of the dead bone.

When the shaft of a bone, or portion of the shaft, has been removed, it is replaced, as a rule, by growth upward and downward from the sound bone at its extremities, and by growth of the periosteal bone. This growth is slow and may require a year for its completion. Therefore as long as the *x*-rays show that it is actually going on, no need exists for interference. If the growth stop, before complete repair of the shaft, the gap may be bridged by grafting in a piece of bone, preferably a piece of another bone from the patient—autoplastic graft. It is necessary that the graft be inserted at each end into sound bone. If the ends of the receiving bone be eburnated, they must be trimmed off.

The employment of this graft in cases of nonunion following simple fracture is well worth a trial.

In old osteomyelitis of the tibia Codman and Stone,[1] instead of taking an actual graft from another bone, transfer the fibula into the dead tibia, doing the operation in two stages, first implanting one end of the fibula, and when these have united the other.

For filling in cavities in bone that will not heal, various expedients have been recommended, some of them on purely theoretical grounds. Small pieces of sponge, discalcified bone chips, aseptic blood clot, are some of the materials that are now rarely employed. Nichols' plan of subperiosteal resection of the affected portion of the shaft seems the most logical of all, making sure of the complete removal of all sclerosed or eburnated bone, in order that the marrow may have a chance to build up the vacancy.

Mosetig-Moorhof[2] advocates filling in these cavities with a mixture of iodoform 40 parts, and of oil of sesame and spermaceti 30 parts each. After the cavity has been made as aseptic as possible and perfectly dry, the iodoform mixture is heated to a temperature of 80 degrees centigrade and is poured in.

Some surgeons have had good results with this paste, others have not. Its effect is probably purely mechanical. The only specific effect of iodoform here or elsewhere is probably a bad smell, or in rare cases severe symptoms of poisoning.

To bismuth subnitrate paste a specific action has been also attributed, but here, also, an occasional case of bismuth poisoning has caused the adoption of a more harmless mixture. (See the section on joint tuberculosis.)

A procedure which has met in some instances with success is the chiseling away the sharp, abrupt edges of the bone cavity, followed by nailing the skin to the bone.

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[1] Codman and Stone, *Annals of Surgery*, October, 1907.
[2] Mosetig-Moorhof, *Surgery, Gynecology and Obstetrics*, 1906, III, 547.

CHRONIC INFLAMMATIONS IN THE BONE SHAFTS

SYPHILITIC OSTEOMYELITIS AND PERIOSTEITIS.

Syphilitic bone lesions may occur in the hereditary form of the disease, and in the late secondary or in the tertiary stage of the acquired form. Certain of the manifestations are characteristic, and enable us to recognize the disease almost at a glance; others are not so characteristic. Here as elsewhere in the body, protean is the best adjective to describe the evidences of lues.

PATHOLOGY.

Syphilis may affect the central marrow, the marrow of the cortex, or the periosteum. Sometimes all three suffer. A frequent result of the morbid process is the formation of larger or smaller collections of a mucilaginous material and the local destruction of the bone. Around this collection of dead bone and mucilaginous material the bone may be sclerosed. Sometimes in the interior of the bone these collections may attain the size of a nut. When they lie near the surface they may become secondarily infected, forming abscesses, which later burst, and communicate with the surface.

8.
Skiagram of tibia in advanced case of Paget's deforming osteomyelitis. Note the rarefaction.

A common situation for them is immediately underneath the periosteum. The openings of the sinuses upon the surface are wont to be dark red, undermined and ragged, not pale and puffy as is the case with tuberculous sinuses. What gives to syphilitic disease of the shafts its peculiar and almost diagnostic appearance is the thickening of the periosteum—a production of new bone, sometimes spindle shaped and sometimes more diffuse, and extending for a considerable distance. This bony thickening may be very painful. Especially in congenital syphilis the tibiæ become thickened and curved anteriorly, taking on a peculiar "saber shape."

Another and rarer effect of congenital syphilis is an irregularity of the epiphyseal line. It is toothed and notched instead of being straight or slightly arched. Occasionally disease in the neighborhood of the epiphyseal line causes a dislocation of the epiphysis.

Congenital syphilis is also responsible for the fairly frequent disease of the metacarpals and phalanges, and a condition results hardly to be distinguished from tuberculous dactylitis. Secondary infection and sinus formation is fairly frequent in this syphilitic dactylitis, and a portion of the end of one or more of the finger bones may be destroyed. Owing to the thin covering of these bones, the skin over them is usually discolored when they are involved in a syphilitic process.

9.
Paget's Osteomyelitis (Osgood).

SYMPTOMATOLOGY.

Pain is wont to be a prominent feature, but it may be insignificant or absent. When present, it is usually worse at night. Usually a periosteal thickening is palpable, and is apparent in the skiagram. The Roentgen rays may show also areas of rarefaction in the shaft. When the lesion is located near the end of the bone it may show in the skiagram as if it had been bitten out. If the bone be superficial, reddening and infiltration of the skin are present, and often small fluctuating areas may be detected.

Syphilitic sinuses have already been described. The course of a bone lesion in the limbs is almost always slow, and its appearance is sluggish. Other signs of lues should be sought for—bone lesions in other parts of the body, enlarged liver, spleen or lymph nodes, etc. The Wassermann or Noguchi reaction will usually be present.

Fractures are said to occur occasionally in syphilitic bone disease. That they are not more frequent in the cases with localized areas of rarefaction is probably on account of the thickening of the bone cortex.

DIAGNOSIS.

The diagnosis is sometimes easy, sometimes quite difficult. It may be made on the signs of syphilis elsewhere in the body, as well as upon the symptoms and skiagrams. The spindle-shaped enlargement is very suggestive when it is present.

An osteomyelitis due to pus germs is wont to be more acute in its course, and to be accompanied by more severe constitutional symptoms, though the slow, "sub-acute" cases may resemble bone syphilis. Sarcoma may sometimes occasion confusion, but the rarefaction of the bone as shown by the *x*-rays is very prominent in central sarcoma, and the production of new bone is insignificant. Periosteal sarcomata are often distinguishable from syphilis by the irregular growth at the site of the disease.

TREATMENT.

Our chief reliance should be on anti-syphilitic drugs—mercury, salvarsan and the iodides. Operation should be avoided if possible, though, if secondary infection have taken place, incision and drainage may be justifiable. If a sequestrum be present in such a case, it should be removed, but all bone-scraping operations are quite useless.

Secondary infection almost always makes the healing of the lesion much more tedious, and it may be said in a general way that the longer the disease has lasted the slower will be the recovery.

Gonococcic osteomyelitis is generally considered to be rare. Gonorrheal periosteitis on the other hand is said to be fairly frequent in certain locations, especially under the calcaneus.[1] In this situation spurs result from the irritation. Baer and others have obtained good results by chiseling off these bony spurs.

It should be remembered that in normal feet a spicule of bone often extends forward from the calcaneus at the attachment of the plantar fascia.

A peculiar condition of sensitive feet, found occasionally in patients with chronic gonorrhea, is probably due to a mild degree of periosteitis. The patients walk as if they were treading on eggs. The affection yields to strapping and to treatment of the urethra, as does often the more definite lesion mentioned above.

Typhoid Osteomyelitis or periosteitis is fairly frequent. It develops usually in the late stages of the disease, in convalescence, or after recovery. The typhoid bacillus alone may be the causal organism or it may be joined by ordinary pus cocci. Abscess formation is frequent. The bone is killed in greater or smaller pieces. The fistulæ remaining after the abscess has opened often persist for a long time.

The treatment is conservative where possible. If secondary infection occur, incision and drainage are necessary. Bone scraping here as elsewhere is quite useless, though the various expedients for healing up bone cavities may meet with success.

OSTEITIS DEFORMANS—PAGET'S DISEASE.

PAGET'S OSTEITIS DEFORMANS. CHRONIC DEFORMING OSTEOMYELITIS.

The exact pathological process at the bottom of this disease is a matter of debate. It is usually considered to be a form of chronic inflammation of the bone, but as, according to the ideas already advanced, the bone itself is not subject to inflammation, we shall adopt the generally accepted view that the disease is essentially an inflammation, and shall class it with the chronic inflammations of the marrow, regarding it, that is, as a *chronic osteomyelitis*. Indeed although some of the marrow changes resemble those of giant cell tumor (myeloma), the general pathological process often seems to bear a marked resemblance to that observed in bone syphilis.

The disease most often is observed after 40 years of age, and occurs about twice as frequently in men as in women.

Etiology: This is unknown. The morbid changes bear a certain resemblance to those observed in syphilis, and certain cases are said to have reacted favorably to antisyphilitic treatment. From these facts (or theories) some observers maintain that syphilis is a causal factor. Paget, after whom the disease takes one of its names, denied this. Of eight of his cases traced to the end, five died of cancer. Some later writers have not been able to trace this relationship, or coincidence. "Trophic" disturbances, as in many other bone and joint diseases, have been held responsible.

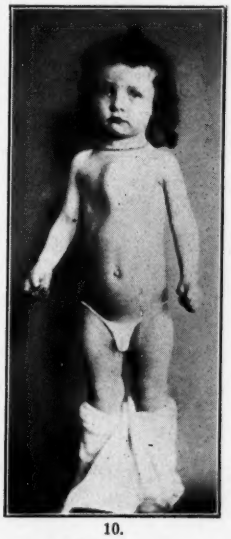
Bartlett's case had a very large pituitary gland. The disease seems at times to manifest an hereditary nature. Disturbances of the thyroid has been observed in several cases. Since good authorities differ so radically, we shall not be criti-

cized if we adopt the view that some obscure infection of the bone marrow and of the periosteum is responsible for the disease.

Pathology: The gross pathological changes, as described in Paget's original article, are as follows:

"Periosteum not visibly changed. The outer surface of the walls of the bones irregularly and finely nodular, as with external deposits or outgrowths of bone, deeply grooved with channels for the periosteal blood-vessels, finely but visibly perforated in every part for the transmission of the enlarged small blood-vessels. Everything seemed to indicate a greatly increased quantity of blood in the vessels of the bone.

"The medullary structures appeared to the naked eye as little changed as the periosteum. The medullary spaces were not encroached upon.



10.
Rickets.

"The compact substance of the bones was in every part increased in thickness. In the greater part of the walls of the shafts of the bones the whole construction of the bone was altered into a hard, porous or finely reticulate substance like very fine coral. In some places there were small, ill-defined patches of pale, dense and hard bone, looking as solid as a brick.

"In the compact covering of the articular ends of the long bones the increase of thickness was due to encroachment of the cancellous texture, as if by filling its spaces with compact porous newformed bone."

Packard, Steele and Kirkbride sum up the pathological changes thus: "Osteitis deformans is a disease affecting the skull, vertebrae, and certain of the long bones. Its essential pathological characteristics are:

"(a) Absorption of the compact substance causing enlargement and confluence of the Haversian canals.

"(b) Formation of new bone which runs diffusely through the affected and the adjacent healthy portions. This new bone remains uncalcified, and is in turn reabsorbed.

"(c) The conversion of the medullary substance into a vascular connective tissue containing fat cells, giant cells, and leucocytes. In a small proportion of the reported cases cysts filled with gelatinous material and giant celled sarcomata occur in the medulla."

If (c) be placed before (a) and (b) the process can be better understood.

As a consequence of these three processes, the ordinary relations of the compact substance and

11.
Rickets. Skiagram of hand and forearm.

medulla are destroyed. The bones become exceedingly thickened and asymmetrical, but since the new bone tissue remains uncalcified, its elasticity permits of great deformity of the long bones from the weight of the body, and fractures do not occur.

Ellis says: "Essentially there is resorption of the bone and the production of an enormous excess of a substance which, probably from the lack of a better term, we designate fibro-osteoid tissue. Fibrous tissue, generally loose and cellular, in instances more dense, is a conspicuous figure. . . . The giant cells, with their basophilic protoplasm, are I think safely to be regarded as destructive in function."

Symptomatology: Paget's disease is usually slow and insidious in its onset, so that the time of its invasion can be set only approximately. Pain may or may not be present.

The disease manifests itself essentially by these physical signs: The legs and thighs are bowed outward, the former also forward. The lower extremities as a whole seem too large for the trunk. The spine possesses a long, stiff anterior curvature, not unlike that of an ordinary spinal arthritis. The skull is enlarged, the head carried forward, and the hips widened. The bones of the arms and forearms may be affected, as a rule, not so severely nor so early as are the bones of the lower extremity. The skull and the tibiæ are usually the first bones to show the morbid changes.

Goldthwait, Painter and Osgood publish a skiagram of a case in which the bones of the forearm were affected. Some cases show a marked preponderance of changes in the left side of the body. Arteriosclerosis is a frequent accompaniment.

Roentgen rays show the thickened bones, the distortions, and often the rarefied bony areas.

Diagnosis: The identification of a typical case is usually easy. Milder cases may occasion confusion for a while. The saber tibiæ of congenital syphilis make their appearance in childhood. The peculiar changes in the other bones are not present in congenital syphilis.

The fractures which are so frequent in osteomalacia do not occur in Paget's disease, nor is there any production of new bone at the periphery in osteomalacia.

Prognosis: The disease may exist for a long time, but is considered incurable. Death may be due to some intercurrent disease, or, in a certain proportion of cases, to malignant growths.

Treatment: Treatment is palliative. So-called "antirheumatic" drugs are probably useless. Antisyphilitic drugs may be tried. Search for some source of infection might be worth while.

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RICKETS—RHACHITIS.

Rickets is a constitutional disease whose cause is unknown. It manifests itself largely by morbid changes in certain of the lymphoid tissues of the body. Unhygienic surroundings predispose to it faulty feeding and syphilis also stand in some sort of a causal relationship. Rickets is a disease of infancy and of early childhood. Fetal rickets is generally considered a misnomer. The existence of late rickets, that is, in adolescents, is still a matter of dispute. The disease is more common among certain races than among others, and in certain climates than in others. People from southern climates, transplanted to northern, seem especially affected, possibly from the fact that they live more indoors in their new home. Rickets is common in England and in Germany, and in our northern cities many cases are seen among Italians and negroes. It is less common in the country than in the city. Rickets has been held to be an infectious disease, but proof of this view is lacking. Possibly the marrow changes may be due to any one of a number of infectious agents, and the intestinal symptoms, so frequently observed, point to the intestinal canal as a possible source of infection. Changes in the long bones are among the most prominent evidences of rickets.

The marrow, according to Nichols, becomes a very vascular, myxomatous tissue. Islands of osteoid tissue are found in it. Kassowitz maintains that one of the earliest changes is a chronic inflammation in the marrow. The Haversian canals, and the so-called marrow spaces, are enlarged. The most marked changes take place in the region of the epiphyseal line. Masses of the abnormal marrow push in among the columns of cartilage cells in the zone of provisional calcification on the diaphyseal side of the epiphyseal line. The zone of provisional calcification disappears, and the epiphyseal line becomes irregular and broadened. On its diaphyseal side masses of osteoid tissue, instead of normal bone, are laid down. Islands of cartilage persist in this osteoid tissue. In other words ossification is halted. Calcification does not take place. Layers of osteoid tissue form on the trabeculæ of the diaphysis and of the metaphysis also, and the trabeculæ themselves may revert to osteoid tissue. Osteoclasis of the trabeculæ of the metaphysis and diaphysis takes place.

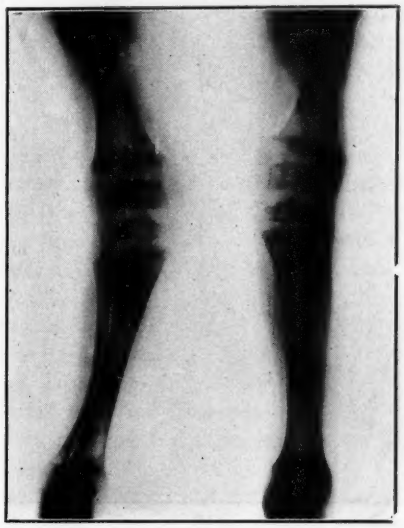
The periosteum is thickened, and its inner layer deposits layers of osteoid tissue instead of true bone. Rarefaction of the cortex may be carried on by the marrow cells. Thus the cortex may be thinned and weakened from within and from without.

In gross the bones become soft and bent. They are broader in the region of their epiphyses. Fractures are fairly frequent. Vascular, spongy, soft, grayish-red masses of tissue are seen in the medulla and on the cortex. The epiphyseal line is broadened, and instead of being sharply defined and approximately straight, is irregular. Medul-

lary and osteoid tissue extend into it. The central medullary canal is widened.

When rickets has run its course, calcification of the osteoid tissues takes place, and the bones become denser than normal—sclerosed. The deformities may persist or they may disappear completely.

Symptomatology: The bones of the extremities become bent and distorted, and thickened in the region of their epiphyses. Bow-legs and knock-knees are extremely common. The fontanelles remain open abnormally long, the head is large and square, the forehead prominent, the bones of the skull are soft. Teething is late, and the child does not begin to walk until after the usual time. Sweating, especially about the back of the head, is profuse. The sternum is often prominent, the chest



12.
Rickets. Skiagram of lower extremities (Osgood).

flattened laterally, and knobs form at the junction of the ribs with their cartilages—the "rhachitic rosary." The spine often possesses a long, rounded, posterior curve, occasionally a more or less angular bend. The abdomen is prominent, the spleen is frequently enlarged. Anemia is always a symptom, probably on account of interference with the blood-forming function of the marrow. The patients are pasty-looking and weak. Gastro-intestinal symptoms are wont to be marked, convulsions and attacks of false croup occur in many cases. Pain and sensitiveness of the epiphyses are often observed.

DIAGNOSIS.

The milder cases may occasion some difficulty, but the severer ones can be recognized at a glance. Scurvy has its acute, exquisitely painful swellings in the neighborhood of the joints, and its hemorrhages into the gums and elsewhere. A mild degree of chronic hydrocephalus produces a change in the skull slightly resembling that of rickets, but it, like scurvy, lacks all the constitutional symptoms of the latter. Osteopsathyrosis shows evidences of numerous fractures.

PROGNOSIS.

Rickets itself involves little danger to life, but children who suffer with it are prone to intercurrent disease, and their mortality is rather high.

TREATMENT.

With our present knowledge, the treatment is largely constitutional. Attention to the diet, and plenty of fresh air are essential. Cod liver oil has been praised. The lime preparations are probably of much value. A child with severe rickets should

13.
Osteopsathyrosis Idiopathica. Skiagram of lower extremities (Osgood).

be kept off his feet as much as possible, in order to prevent deformity. Braces and manipulations are very valuable for curing the deformities, as long as the bones are soft—roughly up to 4 years of age. When the bones become sclerosed, all apparatus is useless. For the severe deformities operation is usually necessary, but never while the bones are still soft. The tendency of the lighter degrees of deformity to spontaneous recovery should be remembered.

OSTEOPSATHYROSIS IDIOPATHICA.

FRAGILITAS OSSIUM OSTEOGENESIS IMPERFECTA.

Osteopsathyrosis means bone fragility. It is observed in a number of different diseases, notably in malignant growths, osteomalacia and tabes. Osteopsathyrosis idiopathica is the name given to a rare

condition (it can hardly be called a disease) in early life, characterized by the occurrence of multiple fractures, especially of the long bones. Its essential nature is still unknown, as is its cause. In some instances the bones are fractured in intrauterine life. The patients are almost invariably quite young. If they reach mature age the condition disappears.[1] Many of the patients are stillborn, others die at an early age. An hereditary element has been observed. The fractures take place from the least possible force, sometimes apparently without cause—spontaneously. They are sometimes many in number. Chaussier counted 113 in a new-born child.

PATHOLOGY.

The characteristic of the condition is a general deficiency in the formation of bone. The cortex of the long bones often consists of a series of platelets instead of a definite continuous layer. The laying down of new bone is deficient both in the diaphysis and in the metaphysis. The details of the process are differently described by different authors. The epiphyseal cartilage is normal, in contradistinction to chondrodystrophia fœtalis. Aseptic necrosis of the new-formed trabeculæ has been observed. If this observation is correct, the condition consists not only in a lack of formation of new bone, but also in a destruction of bone already formed. The Haversian canals may be widened to form large open spaces.

The abnormal bone formation is probably due to disease of the marrow and of the deep layer of the periosteum. In Lovett and Nichols' case the marrow near the epiphyseal line and in the cortex was changed to an "edematous, myxomatous, connective tissue." Döring observed a fibrous degeneration of the marrow in his case, and inflammatory changes in the neighborhood of the necrotic bone.

SYMPTOMATOLOGY.

The chief clinical manifestations of the disease are the abnormal friability of the bones and the multiple fractures. The fractures may occur in utero or after birth. Callus can be felt at the location of the older ones. The skull is wont to be large, and the fontanelles remain open until very late. Teething is also much retarded. According to Nathan the skin and subcutaneous tissues are thickened, giving an appearance similar to that of chondrodystrophia.

14.
Osteomalacia.

15.
Skiagram of osteomalacia bone (Osgood).

The diagnosis is made on the multiple fractures, occurring usually in a new-born baby or in a young child.

The only known treatment is to keep the child as carefully as possible, with the idea of preventing further fractures.

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OSTEOMALACIA.

Osteomalacia means a softness of bone. It is a convenient term, but rather an unfortunate one.

[1] In Biggs' case the disease appeared at the age of 20, and ceased at 30.

The disease in its pathological manifestations is somewhat akin to Paget's deforming osteomyelitis, but without the cortical bone production of the latter. In certain features it also resembles rickets and osteopsathyrosis, but these affect children's bones, while osteomalacia is essentially a disease of adult life.

Etiology: This is unknown. The disease occurs more often in certain districts than in others, and about nine times more often in women than in men. Frequent child-bearing seems to predispose. The early changes in the marrow point to an obscure infection as a possible cause.

PATHOLOGY.

The essential lesion in osteomalacia is an inflammation and degeneration of the spongy and of the dense bone. In the early stages hemorrhages into the marrow are said to take place, which leave behind collections of pigment. Liquefaction and cyst formation are later observed. Decalcification and then disappearance of the bone result. The bones soften, so that they can easily be cut or broken. Spontaneous fractures occur. In the later stages of the severe cases the shaft of a long bone may disappear entirely, leaving only the periosteum filled with broken-down material. No true compensatory bone production takes place in osteomalacia. The attempt by nature to produce bone after spontaneous fracture, results only in osteoid tissues. The bones of the head and face suffer little if at all.

In rare cases the disease in the marrow subsides, the bone-forming function returns, and the patient recovers.

Symptomatology: The course of the disease is usually slow. Pain may be present or absent. The bones of the lower limbs, as they bend, are unable to support the body, and walking becomes at first waddling and difficult, then impossible. The various deformities, caused by the bending of the bones, and by their fracture, appear. Death may take place from exhaustion, or from complicating pulmonary disease.

Treatment is often fruitless. Pregnancy must not be permitted. In some instances removal of the ovaries and tubes has been followed by recovery.

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Pay especial attention to trivial wounds in the lower limbs of those with varicose veins—ulcers readily develop.—Bernays' Golden Rules of Surgery.

AUTOTHERAPY IN SURGERY.

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In a previous paper I stated that the dog, in licking his wounds, gives himself a dose of autogenous toxins. For this reason his wounds heal quickly; he never has a bad infection, except on the head where, from anatomical reasons, he cannot lick. Placing invading pyogenic microorganisms in the mouth early raises the power of the serum and stimulates the activity of the leucocytes quickly to overcome the invaders. More recent tests have established the fact that to have an infected wound heal without apparent infection it is unnecessary to place it in contact with the tongue or mouth. An extension of this later fact will be discussed in the present paper. In introducing this new technic a brief review will be given of my article on autotherapy in the *New York Medical Journal*, December 14 and 21, 1912. In this article it is stated: "If a fresh wound is placed in the mouth, purulent infection will be aborted, and there appears to be good clinical evidence that tetanus and hydrophobia may be aborted in the same way" (see *Lancet-Clinic*, November 4, 1911). "Too often we hear of physicians or surgeons infecting their hands during an operation and dying from sepsis. If the physician will remember then and there to suck the wound and suck it afterwards whenever there is irritation in it, there will be no more deaths from this cause, for the wound will heal by first intention." During the spring of 1913 the metropolitan daily papers recorded the death of four physicians of Brooklyn, N. Y., who died from infection resulting from a scratch received during an operation or autopsy. Had these physicians followed the instructions given several months previously they probably would be alive today. Too great publicity among physicians cannot be given this simple therapeutic measure. Homely it may appear, but in therapeutic value it surpasses anything modern medicine or surgery has yet given us for this condition.

Quoting still further, "In punctured and gunshot wounds where foreign material, such as cloth, wood, etc., are driven into the tissues, if the material is removed before antiseptics are applied and placed in the patient's mouth after he has come out of the anesthesia, there will in all probability be placed in the mouth some of the microorganisms that entered the wound; and we know when this occurs there will be a tendency to prevent infection."

In the *Medical Record*, September 16, 1911, I

stated in my article "A New Method of Vaccine Treatment and Prevention of Sepsis": "Without depreciating in the least the value of aseptic and antiseptic treatment of wounds, the writer offers the *autoseptic treatment of wounds* as a means of resisting a microbic invasion, by raising the power of the serum and increasing the activity of the phagocytes by the action of specific antibodies earlier than by any other known method. It must be admitted that there is much that we do not know in connection with the healing of wounds. This has been demonstrated during the past few years by an enormous amount of clinical experience, for at times when the most rigid aseptic technic has been employed, wounds become septic, and in accidental wounds, where infection is expected, or invited, the wounds often heal by first intention."

The problem that presents itself in applying my autoseptic technic to fresh wounds, outside of the reach of the tongue, is usually quite simple. The problem is solved for most wounds if we merely devise a means of placing the infecting microorganisms in the mouth at the earliest possible time, in order that the resistance to them may be developed before they have become acclimated or accustomed to their surroundings or become residents in the soil of their recent adoption.

In arriving at the proper technic for so doing we have established facts to guide us—facts that practically bear out the contentions that I have assumed. As for example, the dog licking and curing his wounds, and other facts that let in a flood of light on the subject, namely, that purulent infections will be healed in the quickest and best manner possible when the patient's own pus is placed in his mouth.

This later fact is established by many hundreds of cases treated by me, and by an enormous amount of clinical evidence, gathered from independent physicians from all parts of the United States, and from the opinion of many veterinarians who have used this method successfully. A fresh wound usually bleeds to some extent. If pyogenic microorganisms enter a wound some of them will tend to be washed out with the blood. Some of the microorganisms are probably destroyed by the blood plasma. Those remaining in the wound that proliferate and those that come out with the bleeding, engage our attention, particularly at present. In an infected wound we expect pus will make its appearance by the third or fourth day. During this interval the invading microorganisms must proliferate extensively. The exudate formed by the rapidly multiplying organisms is fluid and is usually on the surface or sides of the wound. Being fluid it travels in the direction of least resistance, and if the wound is drained freely it tends to travel towards the surface, and soak into the gauze covering the wound.

While on the subject of prophylaxis, or preventive medicine, I want briefly to refer to an abstract from Test's "Materia Medica and Therapeutics," published in 1854 by Rodemacher and Sheets, of Philadelphia, translated from the French, page 569.*

"It appears the following procedure is resorted to in Russia to prevent the development of hydrophobia, and that the procedure is generally successful, or rather infallible. When in a pack of hounds one becomes rabid or is bitten, all the rest are set against him, and he is soon torn to pieces. Several of the pack are bitten, of course; but this is not heeded, provided they are permitted to swallow some of the blood of the dog. If any of the dogs should not have licked any of the blood, their fauces are rubbed with the bloody flesh. No one of them is attacked with the disease in such a case. The same procedure is employed in regard to man, with this difference: Some of his own blood from his own wound is drunk, instead of the dog's, on the same day or the day after the bite was inflicted. These facts were related to me by a man of high standing and high intelligence and are worthy of all confidence. He, himself, was bitten in the right hand by a mad wolf, and it is this very treatment that saved him from the terrible consequence of such an accident. Other intelligent Russians have verified these statements."

Stress has been laid on the fact that vaccines should always be given early to be most effective. When the bactericidal elements of the blood are established before the pyogenic wall is thrown out, the phagocytes will have free access to the invading organisms and will tend to destroy them quickly. As the result of clinical tests in early building up the bactericidal elements of the blood, I have formulated the following general autoseptic rule for surgery:

GENERAL AUTOSEPTIC RULE FOR SURGERY.

If the exudate or a dilution of the exudate from any fresh wound is filtered through a Berkefeld filter and the filtrate is injected hypodermatically at proper intervals, purulent infection will tend to be aborted.

A corollary to this general rule, that is often more convenient in the application of this principle, may be stated as follows:

If the discharge from an extraordinary or

* I am indebted to Dr. Joseph Beaty of Dobbs Ferry for this reference.

extrapulmonary fresh wound (the most common class of wounds with which we have to deal) *is placed in the mouth at proper intervals, purulent infection will tend to be aborted.*

In test cases the writer has practically thrown aseptic and antiseptic technic to the winds, and he has never had an apparent infection follow this treatment. Wounds of the stomach and lungs must be treated by following the general rule as laid down above, for reasons that will be given later. Compound fractures of the legs, arms, skull, etc., may be successfully treated by either of the above methods with equally good results. It is a question as to how far down in the alimentary tract a wound may be located to be treated successfully by following the treatment outlined in the corollary. It appears that wounds of the ileum and the large intestine may be treated successfully in this way.

In closed wounds and in some punctured wounds, where the exudate does not come to the surface, and therefore cannot be obtained, this application of autotherapy is not practical. In closed wounds a small silver wire inserted for three or four days will tend to lead the exudate to the surface, without leaving a large opening. This often appears to be all that is necessary to allow the exudate to come to the surface. *When we are able to obtain the infecting microorganisms in the exudate early, and use them autotherapeutically, there is no necessity for a wound ever to become purulent.* It is conceded, of course, that shock, loss of blood, churning of the tissues, foreign bodies in the wound, etc., complicate the conditions, and the good effect of fortifying the system, under these conditions by autoinoculation, might not be as apparent as under conditions we would ordinarily expect to find in a wound. It is assumed the surgeon will remove all foreign bodies and treat the wound otherwise by well-known surgical procedures. In this discussion, we are dealing principally with wounds uncomplicated, except with pyogenic microorganisms. However, in all other wounds this treatment would tend to be beneficial, for under any conditions we would be able to obtain the infecting microorganisms and fortify the system against the successful invasion of pyogenic microorganisms, sooner and better than by any other method heretofore advanced. In treating wounds autoseptically, I wish to be distinctly understood as not advocating or recommending that any extraneous material or foreign microorganisms be placed in the wound, either by careless or willful handling of the wound, although in my test cases I handled many accidental wounds that appeared to be unsterile with unsterile fingers, and I have invariably had my test cases heal without apparent infection. (See *Medical Record,* September 16, 1911.) Aseptic technic should always be employed as far as possible. Autoseptic technic should be employed also, as an additional element of safety; for if our aseptic technic has, for any reason, been faulty, or, if for reasons little understood at the present time, the wound becomes septic, autosepsis would then tend to build up the bactericidal elements of the blood, and in this way cause the wound to heal without infection being appreciable. Autosepsis gives us more latitude in our operative surgical technic, correcting faulty surgical aseptic technic. It is not necessary to use the filter in the autoseptic treatment of wounds except in those comparatively rare injuries where a wound is received in a locality that is connected with the alimentary canal, or respiratory system. Treating wounds in any other part of the body the physician may employ the exudate direct by the mouth as a therapeutic agent. Administration of a watery dilution of the wound discharge may be assigned to the night nurse, to be given after the patients have retired. A little cocoa added, just previous to its administration, will disguise any floating particles of blood.

Dress the wound as soon as possible and daily thereafter. At each dressing catch all the oozing from the wound that is possible, using the blood-stained gauze immediately over the wound and the drain, if there is one. Add only enough water to bring it to half an ounce of fluid. The gauze and water are placed in a bottle and well shaken. It is then allowed to stand for about twelve hours, at the end of which time it is filtered through a Berkefeld filter and twenty minims of the filtrate are injected hypodermatically in the loose cellular tissues over the biceps muscle. Keep this treatment up daily until the danger of the infection has passed.

A method of hurrying this process consists of grinding the discharge in a mortar with powdered glass. After it is thoroughly ground, it is placed in a bottle of water, thoroughly shaken to dissolve the soluble toxins, filtered and injected in the manner described above.

Allowing the mixture of water and discharge to stand, and the agitation as part of the first process, as well as the grinding of the second process, destroy some of the microorganisms mechanically. Their toxins will then go in solution by autolysis and be in the filtrate ready for use.

The technic for the application of the autotherapeutic principal contained in the corollary is as follows: Dress the wound daily, at least twice. At each dressing cut out about four square inches of

the stained gauze immediately over the wound, place it in a four-ounce bottle of tap water, shake it well and give the decanted mixture to the patient to drink. I would recommend this last process highly. The first inoculating or parent microorganisms are usually few in number; they must multiply extensively before pus can be seen. At the time this treatment is being carried out the system is usually better able to react to the toxins than it would be later, for it is not then reduced by the fever coincident with pyogenic infections. The microorganisms are not as virulent then as later, when many successive generations of them have developed.

In deep and severe contusions, with much clotting of blood and ecchymosis, it had appeared to me in several instances that using the blood clot as a therapeutic agent quickly relieved the pain. Bail pointed out that it was the tissue toxic substances that cause wound fever in clean wounds. Healthy tissues tend to react to a sublethal dose of any toxic substance that is placed in them, and this reaction or resistance is specific or exactly antagonistic to it.

Reaction is diametrically opposite to action. Reaction to a toxin is the true cure for the toxic condition. The action of toxins on the body develop symptoms, the reaction is the true cure for these symptoms.

If we place a turtle toxin, or test-tube toxin, or a toxin from some other patient or source in comparatively healthy tissues, the tissues will tend to develop resistance or reaction that is opposite or specific to *it*, but this reaction is not the reaction to the toxins from which the patient suffers, and the cure resulting from this reaction is wholly problematical. Giving any other toxin than the patient's own toxins is guess-work prescribing, pure and simple, for there is no certainty that the reaction to any heterogenous toxins will be the curative reaction to the disease. Experience for the past century has clearly proved this. The patient is suffering from his own toxins, toxins that are in his own body, and when these are placed in comparatively healthy tissues the resistance or reaction developed to these is exactly antagonistic to them and is the specific resistance to the disease.

In one of the large emergency hospitals in New York City where the writer is operating surgeon, abundant opportunity for proving the therapeutic value of the autoseptic method of wound treatment has been afforded. It is distinctly a new procedure, and entirely foreign to all modern methods of wound treatment, and yet wounds do usually remain free from pus when this treatment is given. Free drainage and autoseptic technic will cause almost any non-fatal wound to heal without infection being apparent. In the last analysis it appears that a patient may often abort infection by simply chewing his own bloody dressings twice daily. This is a fact, and we cannot know too many facts. The trouble in the past has been that we have known too few. The knowledge of this simple fact may in certain rare instances or conditions be the means of saving human life. Had the soldiers in the bloody wars now going on in the Balkans and in Mexico known this simple fact, it is certain that the lives of many patriots would have been saved, and untold suffering prevented. The autoseptic treatment of wounds in no way interferes with the established aseptic method, but offers an additional simple and effective safeguard against infection when the treatment is properly carried out.

It is the source of a great deal of satisfaction to approach the operating table with an additional assurance that no apparent infection will follow the operation. If the condition is purulent when it comes to operation, autotherapy will clear up the condition quicker and better than any other known medication.[1 2 3 4 5 9] There is no doubt in my mind that by autotherapy many conditions supposedly demanding operating measures may be cured and the operation itself avoided. (See *The American Practitioner*, July, 1913, article by the writer, "Autotherapy versus Operation.")

CASE I—Male, age 28; was admitted to the hospital December 14, 1912, suffering with a compound fracture of both bones of the left leg, lower third. The wound was opened, all blood clots removed, and a sterile drain inserted. The leg was put into a plaster cast with a window. On December 14, before the operation, and on the 17th, 23rd and 25th, the following treatment was given: About four square inches of the stained gauze immediately over the wound was placed in a four-ounce bottle of water; this was thoroughly shaken and the decanted mixture given the patient to drink. The wound healed by first intention.

CASE II—Male, age about 30; was admitted to the hospital June 9th, suffering with a compound fracture of both bones of the left leg, lower third. Lane plate inserted and the wounds drained. Four square inches of the stained gauze was placed in four ounces of water and thoroughly shaken. The decanted solution was given to the patient to drink. This was repeated daily, at times the drain being used instead of the gauze. The temperature rose to 99.5° about eighteen hours after each treatment. The treatment was discontinued for a day to see if the temperature would rise when the treatment was not given. It did not. The treatment was again given daily. There never was but a slight staining on the gauze, hardly more than we would expect from a healthy granulating surface.

CASE III—Male, age 22; was brought in June 23rd on the ambulance, suffering with a penetrating stab wound of the left chest between the third and fourth ribs. Upon deep breathing bubbles of air came from the wound. His sputum was streaked with blood. The wound was cleansed externally with normal saline solution and a small sterile drain inserted. In six hours the drain was removed, and placed in an ounce bottle of water. This was allowed to stand for about twelve hours with occasional agitation. It was then filtered and twenty minims were injected into the loose cellular tissues over the biceps muscle. Five treatments were given two days apart, and the wound healed by first intention. In three weeks the patient was discharged cured. The toxins from this wound could not be given by the mouth as successfully as by giving them hypodermatically.

Healthy tissues develop the maximum resistance or antibodies to toxins that are placed in them. It appears from clinical experience that tissues involved with disease toxins react to them in inverse ratio to their involvement; that is, the greater the involvement, the less the reaction, and, conversely, the less the involvement the greater reaction are they capable of developing to them. In this stab-wound of the lungs it is altogether probable the wound was infected, for the lungs contain myriads of pathogenic microorganisms. The wound, being infected, could be classed as bronchitis or other respiratory disease. Now, in bronchial affections there is very little reaction by the tissues of the stomach, because the patient is constantly swallowing the toxins contained in the sputum, and these tissues are already involved with the toxins; but when the sputum is filtered through a Berkefeld filter and the filtrate injected hypodermatically, the cure in all acute conditions is expected to follow quickly; and many chronic conditions are, I believe, benefited more by this treatment than by any other medication.

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MILITARY SURGERY.

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XIII.

GUNSHOT WOUNDS OF THE FACE.

That missiles properly classed as gunshot wounds of the head proper (skull) may involve the face as well, requires no proof, especially when one thinks of the varieties of direction of modern fire which may come from the sides, rear and oblique directions as well as from the front. The position of the soldier (half-erect, stooping, etc.), too, may result in a wound of entrance being in the head and the wound of exit in the face.

Face wounds proper form an interesting class of injuries from a surgical point of view. First of all, the naso-pharynx, when involved, is almost sure to produce infection, and our protective measures, as advocated for other injuries, will fail to prevent serious suppuration, pyemia, erysipelas, etc.

Again, wounds involving the soft parts only may leave scars, which will interfere later on with such functions as speech, swallowing, etc.

Nevertheless for the purposes of therapy it can be said that at the frontal stations the aid to be rendered will not differ much from what has been described in previous sections. At the field hospitals, on the other hand, we will resort to irrigations, with disinfecting solutions, to overcome infection, and at the base institutions the greatest possible surgical skill will be needed to correct deformities.

Finally, the eyes, ears and tongue are important organs, which, when injured, may tax the ingenuity of even an otherwise skillful surgeon operating away from field or base hospitals.

At the front two therapeutic measures may become important: tracheotomy and suturing the tongue to the chin or anywhere else calculated to keep that organ—when swollen—in place to prevent interference with respiration.

The field kits as at present issued by our medical department make no provision for tracheotomy appliances. At the last International Red Cross Conference held May, 1912, in Washington, and at the meeting of the Association of Military Surgeons of the United States, held in Denver, Sept. 16-19, this year, I exhibited a field case to be carried by the surgeon slung over his shoulder like a field-glass case. This case, scarcely any larger than one containing military binoculars, contains in a sterile roll practically all the instruments needed for tracheotomy and other urgent operations, including antiseptics, stimulants, narcotics, etc. Indeed, in my opinion, every civil surgeon should possess such or

a similar equipment, for, in my opinion, the usual pocket cases are useless in great emergencies, if not positively dangerous.

I shall publish a special article on this subject in this journal in the near future.

Finally, I desire to call attention to the great need of tamponade, both of cavities and wounds in injuries of the face—something to be condemned unequivocally in other gunshot wounds.

INJURIES OF THE SOFT PARTS.

Pure injuries of the soft part of the face without involvement of the bones will be rare. Of course at long ranges or in ricochet bullets it is not at all unlikely that the projectile may be deflected and thus an angular canal wound of the soft parts (cheek) created. The bullet may become lodged because lacking energy to overcome resistance by bone. As a *unicum,* I may mention a case reported by Prof. Trendelenburg concerning an officer whose both cheeks were traversed by a bullet without involvement of the maxillary. The officer was yelling a command at the moment he was hit!

Gunshot wounds will either not differ from the usual appearance encountered elsewhere in the body or, because of the construction of the facial contours, nose, lips, ear and cheek, may be shot away or at least torn in the shape of large flaps.

The treatment at the front will, in view of what has been said, consist of tamponade, compression bandage, and—note well! *suture.*

Sewing a wound in the field appears contradictory to our teachings, but—*nulla regula sine exceptione!* And the face forms the exception. Occasionally a spurting artery may have to be clamped and twisted by forceps.

INJURIES OF THE BONES.

An exact diagnosis of the extent of the injury to the upper maxillary is out of the question without the aid of the Röentgenograph. One will, of course, be able to diagnose fracture of the alveolar processes, but the higher portion of the bone will at best leave us in doubt how much and how extensively it has been fractured. Of course here, too, we may encounter extensive injuries, involving lip, nose and maxillary, leaving huge defects on one hand, and a lodged missile as the other extreme.

At the front only loose and easily accessible fragments should be removed. Unless absolutely loose I would suggest a course of *nolime tangere,* for many fragments have healed in, if let alone and if not later attacked by infection. Tamponade of the nasal cavity similarly to the method employed in civil practice for post-nasal hemorrhage, is imperative. This can be accomplished best by pushing gauze strips—the ordinary sterile bandage carried in the kit will prove very serviceable—by means of a director or forceps into the nose in a horizontal direction; or a female catheter may be pushed in after it has been covered with a suitable thickness of gauze, or a soft catheter may be pushed through the nare into the pharynx, caught, pulled out through the mouth, and a tampon fastened to the eye by a long, stout silk thread. The catheter is now withdrawn at the nare and the tampon forced into the posterior nasal cavity. The last method is, of course, time-consuming and somewhat too complicated for the field. But whichever method be employed, the prime condition is that the tamponade must be effective. The throat should be inspected to make sure that no blood enters the pharynx.

There is no way of dressing and splinting a fractured superior maxillary in the field. If the fracture, however, is limited to the alveolar process, a bandage can be applied in a manner to press the teeth upwards. A piece of cotton pressed under the teeth will act as the splint—the bandage itself must be tied over the head.

As regards the lower maxillary, practically the same rules prevail, except that splinting is greatly facilitated. Where in extensive injuries the mouth is involved, the problem of feeding the patient through a stomach tube may present itself almost immediately after the administration of first-aid.

The *eye,* if injured, can be treated at the front only by the application of suitable compression dressings. I would earnestly recommend moist dressings whenever possible. A drop of atropin into the uninjured eye should never be omitted.

The *tongue,* when injured, requires no special attention if the wound be small. The surgeon must be ready to look out for complications interfering with respiration, as indicated in the general remarks above.

(*To be continued.*)

The X-Rays in Joint Tuberculosis.

I find the periodical examination by *x*-rays of great value in determining the progress of the healing process in joint tubercle where foci are present in the bone. The reparative changes are accompanied by sclerosis, and this is shown in an *x*-ray picture. Having decided that splints may be left off, I first advise that freedom be given only at night. Then, if, after a fortnight or month, no untoward symtoms arise, I leave off splints during the daytime and allow massage and gentle movements. Thus, cautiously, a return to normal functions is obtained.—W. S. Fenwick in the *British Medical Journal.*

LIPECTOMY—FOR ABDOMINAL FAT.

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Operation for the removal of superfluous fat of the abdominal wall has not received the attention it deserves; considering the perfect results that have been obtained from this procedure.

There is no operation which will win for the surgeon the lasting gratitude of an appreciative patient more surely than the removal of a great mass of fatty tissue from the abdominal wall.

This condition is extremely embarrassing to a woman, as it renders her unsightly in appearance, and prevents her from dressing as other women. She is wholly unable to partake of any exercise,

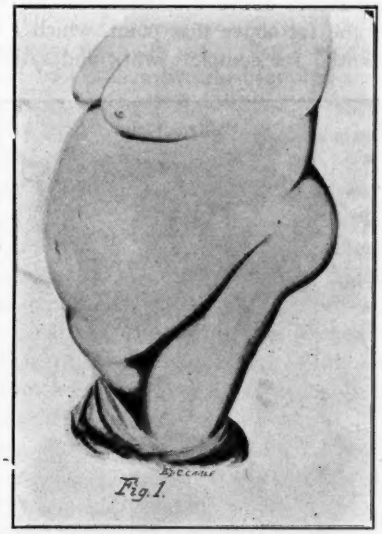

Fig. 1.

which, in itself, favors a continued accumulation of the adipose tissue. She is also particularly sensitive regarding her appearance, and her utter inability to carry out adequate personal toilet, so that she declines to leave her home, and soon becomes depressed and morose.

The case reported here is one which presents the conditions described, to an extreme degree.

Why fat should show such predilection to this part of the body, we are unable to say, and physiology offers no solution to the question.

Our text-books do not throw any light upon this subject, and up to the time I performed this operation, there had been but few papers written upon the subject.

Eight cases of a similar kind had been operated upon, seven by Howard Kelly, and one by Weinhold, of Germany. These were the only cases of this nature that had been reported up to this time. This report was made by Dr. Kelly in the March, 1910, number of *Surgery, Gynecology and Obstetrics.*

Miss N. V.—Age 28, was referred to me by Dr. M. W. Campbell, March 29, 1910. She was healthy in appearance, with a mass hanging half way to the knees, which proved, upon examination, to be fat of the abdominal wall. This fat had continued to accumulate in spite of all medical treatment.

The patient was naturally short and stout. She was depressed and in a highly nervous condition, stating she could get no enjoyment out of life, that her condition was unbearable, and that death would be preferable unless she could get relief. She had always been a hearty eater, took very little exercise, and drank quantities of wine and beer.

The patient had not left her home for three months on account of her unsightly appearance. She

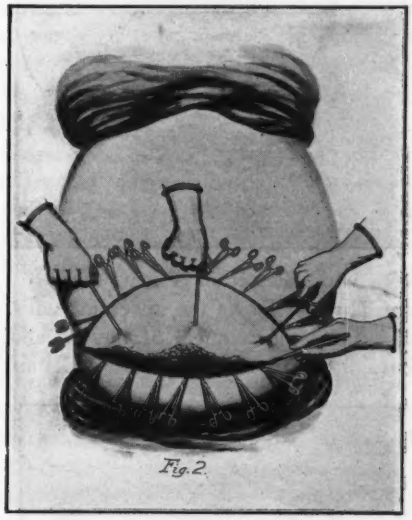

Fig. 2.

wished to be operated upon. She said she had tried everything for the purpose of reducing the fat, including medicines, dieting and physical culture, in spite of all of which the fat on her abdomen continued to accumulate.

On March 30, 1910, she was sent to St. Joseph's Hospital, and on the following morning I operated upon her with the assistance of my colleague, Dr. L. J. Dandurant.

Figure One:—Shows the pendulous mass as it appeared while patient was standing. The mass of fat was picked up in the median line by three heavy forceps, one in the center, and one on each side held up by assistants; I then made the upper incision which extended from the crest of the ileum on the left, to the crest of the ileum on the right, about one and one-half inches below the umbilicus. The lower incision extended from the crest of the ileum on the left to the crest of the ileum on the right, about two inches above the symphysis pubis, re-

moving the wedge of skin and fat down to, but not including, the fascia.

This wedge of skin and fat weighed thirteen and one-half pounds. All vessels were secured with catgut ligatures.

Figure Two.—Shows the apron of fat held up

Fig. 3

by forceps while dissection is being made.

Figure Three.—Shows the lower incisions. Also the incision for the removal of the fat above the umbilicus, through which was dissected the fat on

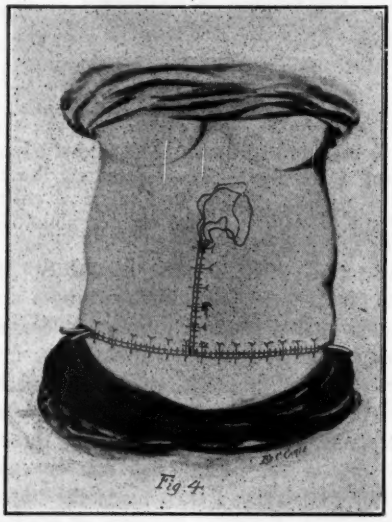
Fig. 4

either side of the incision in this region. This was accomplished nicely with a pair of dissecting scissors.

Figure Four.—Shows the line of incision closed with retention sutures of silk worm gut, with a continuous interlocking stitch of catgut.

Two small perforated rubber tubes were used for drainage on the right side, one extending to the middle of the incision, the other in the incision alongside of the umbilicus. The tube on the left side extended to the middle of the incision. The drainage tubes were removed in thirty-six hours. All sutures were removed on the tenth day, the entire wound healing by first intention. The patient left the hospital in two weeks.

Figure Five:—Shows results after sutures were removed; also shows the perfect contour of the abdomen. I had the patient wear an abdominal support for three months after she left the hospital.

The lines of incision were the same as those of Dr. Kelly's with the addition of the vertical incision extending from the transverse incision to a point about five inches above the umbilicus, for the removal of the fat above that point, which I believe to be essential for complete work and satisfactory

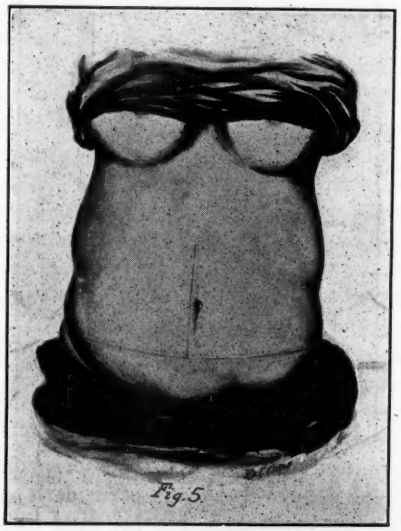
Fig. 5

results in an operation of this character, as it is a simple matter to remove the fat through this incision.

I have waited three years before making a detailed report of this case, in order that I might be able to determine the ultimate results. Having had the patient under observation for this extended period of time, I am pleased to report that she is an active, healthy and well formed woman, with a straight front abdomen, and one of my most grateful patients.

Judging from the reports of Dr. Kelly, and from the results in my own case, I would say in conclusion:

First:—That there is practically no danger from abdominal lipectomy so far as life is concerned, provided aseptic technic is observed during operative, and post-operative manipulation.

Second:—That healing is by first intention if the proper technic has been observed.

Third:—Perfect contour of the abdomen can be secured.

Fourth—The fat does not return and the patient maintains a well formed abdomen.

This case was reported to Dr. Kelly in May, 1910.

FRACTURE OF THE CORONOID PROCESS OF THE ULNA WITH REPORT OF A CASE.

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This fracture, the frequency of which has been much disputed, has been unquestionably very rare, except as a complication of dislocation of the ulna backward.

Malgaigne mentions three reported cases: one published by Combes Brassard, an Italian surgeon, in 1811; one seen by Penneck, and published in the *Lancet* in 1828, and the third was reported by Sir Astley Cooper.

Dorsey also reports a case of fracture of the coronoid process. In 1830 Fahnestock reported a case occurring in a boy who, having fallen from a haymow, received the whole weight of his body "on the back part of the palm of his hand" while the arm was extended forwards. It seemed to be a dislocation of the forearm backwards, but when reduced it was again immediately displaced, with an evident crepitus.

Couper of the Glasgow Infirmary also reported a dislocation of the forearm backwards and outwards, occurring in a man aged 17, which was accompanied by a fracture of the coronoid process. The dislocation was easily reduced, but returned again immediately on ceasing the extension. The fragment was not felt, nor does he speak of crepitus; the existence of the fracture being inferred from the fact that the bones would not remain in place without help. The forearm was placed across the chest, the fingers pointing towards the opposite shoulder, and secured in this position with splints and a bandage. At the end of four weeks union had taken place, with only slight deformity, but with some stiffness of the joint.

In the *American Medical Monthly* for October, 1855, Crosby reports a case in a boy aged 9 years, with an outward dislocation accompanied by a fracture of the coronoid process of the ulna.

Sir A. Cooper in his book says: "Up to this time there are only four cases reported."

Stimson in his latest edition of "Fractures and Dislocations" says there are only about 15 cases on record. In reviewing the literature on the subject, I find that a German army surgeon, Lotzbeck, reports eight cases of fracture of the coronoid process of the ulna, several of these being accompanied with a backward dislocation of the ulna. I doubt very much whether there are more than five cases of true fracture of the coronoid process of the ulna that have been reported up to the present time.

Causes.—It is probable that this process will sometimes be broken in a fall upon the palm of the hand, the force of the blow being received directly upon the lower end of the radius and through its numerous muscles and ligamentous attachments being indirectly conveyed to the ulna, producing a violent concussion of the coronoid process against the trochlea of the humerus, and resulting finally in a fracture of this process and a dislocation of both bones of the forearm backwards.

The case seen by Sir A. Cooper was one in which the patient had fallen upon his extended hand while in the act of running. Penneck's patient, a man of 60 years, had fallen upon the palm of his hand; and Fahnestock's case fell upon the "back of the palm." In no other cases is the point upon which the blow was received particularly mentioned. In two of the examples mentioned by Malgaigne there was a luxation of the forearms backwards. Such was also the fact in the case seen by Fahnestock; in Couper's case it was dislocated backwards and outwards, and in Sir A. Cooper's case there was only a subluxation of the ulna backwards.

We know of no other causes, therefore, than such as equally tend to produce dislocations at the elbow-joint, unless we except direct crushing blows which, of course, may break the bones at any point upon which the force happens to be applied.

Symptoms.—Partial or complete displacement of the ulna, or of the radius and ulna backwards, accompanied with the usual signs of these luxations; to which may be possibly added crepitus; and it is fair to presume that in some examples the fragment carried forwards by being driven against the trochlea, may be felt displaced and movable in the bend of the elbow. If only the tip is broken off the brachialis anticus could have no influence upon it; but if it were broken fairly through the base it might be displaced slightly in the direction of the action of this muscle.

The symptoms, however, which have been regarded as most diagnostic, are the disposition to reluxation manifested in most of these examples

[1] *Lancet*, October, 1828.
[2] "Fractures and Dislocations," Sir Astley Cooper, page 411.
[3] *American Journal Med. Sci.*, Vol. 1, page 152, 1813.

when the extension has been discontinued, and especially the fact that the olecranon was particularly prominent when the arm was extended, but that it resumed its natural position when the arm was flexed to a right angle. But I am unable to understand how either of these circumstances can be better explained upon the supposition of a fraction of this apophysis than without such a supposition. If the reduction of both bones is once effected, even though the support of the coronoid process is completely lost, the head of the radius ought to prevent re-luxation, unless the arm is disturbed again; nor can I understand why, when the elbow is bent, the re-luxation is less likely to occur; since although in this position the humerus bears less directly upon the process, the difference in this respect must be very little, for, in whatever position the arm is placed, so long as the radius retains its position, the ulna cannot be drawn very forcibly against the humerus; while, on the other hand, by flexing the arm the power of the biceps, and of such fibers of the brachialis as remain attached to the ulna, to aid in the maintenance of reduction, is completely lost, and, at the same moment, the resistance, and consequent power of the triceps to produce luxation, are greatly increased.

In short, we must confess that, notwithstanding the confidence with which writers have spoken of the signs of this accident, we are much in doubt; nor do we see how these doubts can be removed until we have, in detail, the symptoms of at least one example, the indubitable existence of which has been subsequently verified by dissection.

Prognosis.—Usually favorable. When the fracture has taken place across the tip, or above the insertion of the brachialis anticus nothing but a ligamentous union can be regarded as possible, since the fragment can only derive nourishment from a few untorn fibers of the capsule and perhaps of the internal lateral ligaments; and, although it may not be displaced, it cannot have the advantage of impaction, upon which alone I suspect a fracture of the neck of the femur within the capsule must rely for a bony union, if it ever does so unite. If, however, a fracture has taken place at the base, and fortunately has not become much displaced by the force of the action against the humerus, it does not seem so impossible that, under favorable circumstances, a bony union might now and then occur.

It will be remembered that a good portion of the attachment of the brachialis anticus is still below the fracture, and the remaining fibers are not, therefore, very likely to displace the fragment, especially when the arm is sufficiently flexed so as to properly relax this muscle.

It will be of small importance, however, whether the union is bony or ligamentous, provided only there is not great displacement.

Treatment.—Whatever view we take of the pathology of this accident, the rational mode of treatment would seem to consist in flexing the arm at a right angle, and retaining it a sufficient length of time in that position, not forgetting, however, the danger of ankylosis from long continued confinement in one position. An angular splint may be useful in preventing motion at first, but I think it ought not to be continued beyond seven or ten days at the most. After this a simple sling is all that is necessary, since from this period some motion must be given to the joint, if we would take the proper precautions to prevent stiffness.

Sir A. Cooper thought the limb ought to be kept immovable for three weeks; Cooper says that he adopted, in the treatment of the case reported by him, extreme flexure, and Fahnestock placed the arm at right angles. The latter position has always the advantage in case permanent ankylosis occurs, and the former cannot add much to the chance of complete replacement of the fragment. Stimson says the treatment consists in mobilization of the joint flexed to a right angle, or beyond. The degree of flexion and the completeness of the immobilization may vary with a tendency to displacement. If the latter has occurred experience has shown that it is best opposed by increasing the flexion, and, of course, complete immobilization gives additional security. The mobilization should be maintained as long as a tendency to dislocation exists—when that ceases the splint becomes unnecessary, and the only indication then is to maintain sufficient flexion to favor prompt and close union.

The case which I herewith report is the third which I find on record with definite and complete x-ray pictures.

This man, H. F., age 22, a professional wrestler, on January 24, 1913, while wrestling with an opponent, was grasped by the left leg, and, in endeavoring to save himself from being thrown, grabbed his antagonist by the head, and then he was lifted up and thrown backwards, falling on his wrist, and striking on his elbow. He immediately felt a sharp pain in the left forearm, extending from the elbow to the wrist. He remained on the floor for a few moments, and about 10 minutes later noticed that he could move the elbow as well as ever. Fifteen minutes after the accident he noticed that the elbow began to swell, and become very painful.

A doctor saw him half an hour after the injury, and he was told that he had a fracture of the internal condyle of the humerus. The next day, on account of the swelling and pain, he came to the German Hospital, where he first came under my notice. The examination at this time showed a man

of good muscular development, with swelling round the left elbow-joint, with somewhat marked echymosis and edema. He was able to flex the hand almost at right angles without very much pain. Upon palpation a point of tenderness seemed to exist over the head of the radius and the coronoid process of the ulna. No definite diagnosis was made at this time. An *x*-ray picture was taken the next day. The second *x*-ray picture clearly established the diagnosis without a question of doubt,—clinically it was almost impossible to make it—the differential diagnosis being between fracture of the internal condyle of the humerus or a fracture of the coronoid process of the ulna. The elbow was first placed at right angles, and kept in this position for a period of ten days. At the end of that time the position was changed to that of full extension. At the end of the 20th day the position was again changed to that of acute flexion. At the end of the third period of ten days the hands was removed from the splint, and active and passive motion started.

On March 14—seven weeks after the accident—the patient was discharged, and able to resume his occupation again without any inconvenience whatever. At this time he was able to flex, extend, pronate and supinate as well as ever.

300 Central Park West, New York City.

GALLSTONES WITH VAGUE SYMPTOMS.

The vast majority of cases are not manifest by a severe and characteristic attack, and diagnosis is not forced upon us but it should always be made if we pay attention to the whole picture of the cases and if we hold the view that chronic indigestion and dyspepsia are not normal conditions. In the majority of cases the gallstones are at rest and are not causing active and violent irritation. The gallbladder and bile ducts are chronically but not acutely inflamed. Symptoms will correspond to these conditions and will be those of a slight localized irritation or a slight inflammation of a chronic type and of a slightly disturbed function on the part of the digestive tract. They are mostly those of a chronic dyspepsia, not violent in character. Such patients will have sour eructations, belching of gas, and a sense of fulness and tension after eating. They may have slight pains, slight tenderness and rigidity at the Mayo-Robson point. They usually suffer from constipation. These are the cases where diagnosis is certainly not easy. In some the diagnosis must be inferred. These patients should be carefully watched, and if their symptoms are sufficient to disturb their health, to undermine their nervous system, or make useless or unhappy their lives, they should certainly be operated upon, assuming that they have had careful hygienic treatment without success.—PARKER SYMS, in the *New York Medical Journal.*

A CASE OF SPRAIN OF THE SACRO-ILIAC SYNCHONDROSIS.

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WHITE PLAINS, N. Y.

The peculiar, if not rare, injury which I am about to describe seems to me quite interesting, especially at the present day on account of the number of automobiles in constant use.

The sacro-iliac is an amphiarthrodial joint formed between the lateral surfaces of the sacrum and ilium. The anterior or auricular portion of each articular surface is covered with a thin plate or cartilage thicker on the sacrum than on the ilium. The surfaces of these cartilages are rough and separated by a soft yellow, pulpy substance. Occasionally in an adult they are smooth and lined by a delicate synovial membrane. The joint, as we know, is held together both anteriorly and posteriorly by numerous ligaments. Nerve supply: The pelvic or inferior hypogastric plexus, is formed by a continuation of the hypogastric plexus by branches from the second, third and fourth sacral nerves, and a few filaments from the first two sacral ganglia. The inferior hemorrhoidal plexus arises from the back part of the pelvic plexus. It supplies the rectum, joining with branches of the superior hemorrhoidal plexus. The vesical plexus arises from the fore part of the pelvic pexus, numerous filaments passing to the vesiculae seminales and vas deferens. Those accompanying the vas deferens join on the spermatic cord with branches from the spermatic plexus. Thus the ganglia from the different plexuses of nerves, as enumerated above, if injured in any way, such as by a loose sacro-iliac joint, would cause the patient to suffer pain over the lower part of the abdomen on whatever side might be effected; also severe pain over the rectum in inguinal region and following the spermatic cord to the testicle and scrotum. The small sacral nerve also arises from the lower part of the sacral plexus and supplies the perineum, back part of the thigh and leg, as well as the gluteus maximus muscle.

Mr. C. came to my office seven weeks after his injury, which was received on March 1. He stated that he was cranking his car, and as the morning was quite cold he was obliged to spin his motor. He stood facing his engine and on cranking it the engine kicked back. Fearing to let go of the handle of the crank shaft less he might break his arm, he held on to it. His arm was thrown violently into the air and his back was twisted. All of this happened in less time than he could tell it. At first he was unable to move himself, so severe was the pain in his back. The next day the pain was intense, being relieved

only on lying down, made worse by walking, standing or sitting. The pain seemed to be all over the lower left part of abdomen, rectum, inguinal region and extending down left spermatic cord to testicle and scrotum. He also suffered some pain over the outer part of the hip joint down the back part of the thigh to the popliteal space. After suffering in silence for a few days he decided to consult his physician, who diagnosed rheumatism and muscular strain. The ordinary rheumatic remedies were prescribed, as well as liniments, plasters, electricity and massage—all without avail. He also took a trip to Virginia, thinking the warm climate might do him some good. On returning from his southern trip he consulted me, as he was not feeling any better.

On examination in the standing position I found he had quite a tender spot over the left sacro-iliac joint. I then placed him on a table on his back and had him flex his left thigh upon his pelvis with his knee in an extended position. This he was not able to do without intense pain, which was referred to the tender spot in the left secro-iliac joint. When standing the flexion of his body upon his thighs was very much restricted, due to the pain which such an act caused him to suffer, so that it was impossible for him to remove his shoes and he had to have assistance when he dressed himself. All his symptoms of pain seemed to radiate from his seat of injury, which in my opinion was due to a disturbance of the ganglia of his sacral plexus, caused by trauma to his left sacro iliac joint.

An *x*-ray picture showed the contour and structure of the 3, 4 and 5 lumbar vertebrae, sacrum and part of ilia quite distinctly. The bodies of the 3d and 4th lumbar vertebrae were normal in size, shape and alignment and the spacing between them was adequate. There was, however, an irregularity between the 4th and 5th lumbar vertebrae, which was more marked on the left side than on the right, definitely located at the articulation of the lamimae between these two vertebrae. Whether such a lesion was a fracture or some pathological change in the structure of the bone at this point it was hard to state with absolute certainty as the *x*-ray picture was not taken until some weeks after the injury.

I decided to place his pelvis in adhesive straps, using a pad of felt about five inches square and one and one half inches thick over the seat of his injury behind, beneath the adhesive straps, which were applied while he was in a standing position. I allowed them to pass around the sides of his pelvis just under the crests of the ilium, and continued them forward to the inguinal region on each side. I then bandaged his abdomen and back over the plaster strapping and allowed him to walk. This dressing was allowed to remain for two weeks, when I removed the adhesive straps and had a belt made, which contained a similar pad, which was buckled about him and he wore this during the day and removed it at night for sleeping.

The prognosis in this case is good, for the joint has tightened itself, due to the strapping and the tender point in the back has disappeared, while the patient has been free from all pain and able to go about in perfect comfort.

Conclusions Concerning Anesthetics.

"1. The anesthesia must be placed in trained professional hands.

"2. The methods of giving the anesthetic and the apparatus employed should be as simple and uncomplicated as possible.

"3. The anesthetic mixture and sequences should be, like the old shotgun prescriptions of the past, avoided, and the patient's life not jeopardized by the exhibition of two or more powerful poisonous agents at the same time, which might intensify one the action of the other, or mask the ordinary danger signals.

"4. For routine work ether, by the open or drop method, is the safest and most satisfactory anesthetic, and in the usual run of cases in a hospital service the anesthetic of choice is from 70 to 80 per cent. of the cases. Ether should not be employed per rectum.

"5. Chloroform must be discarded as a routine anesthetic. It produces too many immediate and late deaths to warrant its general employment. It is only in the exceptional case, as possibly in laryngectomy where one might feel that the direct introduction of chloroform vapor into the trachea might produce sufficiently less irritation to the tracheal mucosa with less risk of pneumonia, than ether, that we would be warranted in employing it.

"6. Nitrous oxide is the anesthetic of choice for short operations, manipulations and examinations. It is also the anesthetic of choice in operations on patients with seriously impaired kidneys, and often in cases in extremely bad condition, as typhoid perforations, general peritonitis, etc. It should not be employed in patients with bad hearts. It is not as satisfactory an anesthetic as ether, and it should not be employed in preference to ether in patients who are good surgical risks.

"7. Local anesthesia with cocaine and similar agents has a limited field of usefulness. The amount of cocaine employed by infiltration should always be short of a toxic dose, 1-10 to ¼ of a grain. It should be employed in normal salt solution with small amounts of adrenalin. Where the amount does not exceed 1-19 of a grain it may safely be preceded by a small dose of morphine and scopolamin.

"8. Spinal cord anesthesia has to-day no place in surgery.

"9. The use of morphine and scopolamin before a general anesthetic brings with it dangers which are not compensated for by the advantages, and the method should be abandoned or limited to specially selected cases.

"10. Finally, I believe that the time has come when we must, here in America, make a place for the trained professional anesthetist on our surgical team."—A. D. Bevan in *Surgery Gynecology and Obstetrics.*

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WALTER M. BRICKNER, M.D., Editor

New York, October, 1913.

APPENDICITIS THE VAGARIOUS

In our last issue we considered editorially the etiology of appendicitis and one of its less generally known diagnostic signs. Its clinical whimsicalities also tempt us to discourse.

It is curious, not to say paradoxical, that the disease which in its usual manifestations, is so clear-cut in signs and symptoms, that it is readily recognized by the tyro, should also be the organic affection which most often simulates, and is simulated by, other diseases.

Every physician of experience has learned, we hope, that the signs and symptoms of appendicitis may be but the early manifestations of pneumonia, pleurisy or such infectious disease as measles, scarlet or typhoid fever. Wolf, Craig, Henson and the writer have called attention to the observation that vomiting, and right iliac pain and tenderness may mark a malarial seizure; a mistake in diagnosis may be avoided if there is pronounced pyrexia, or if a severe chill, an enlargement of the spleen, or other evidence directs the attention to palludism; but if these are absent and if there is a high leucocyte count (generally considered absent in malaria), or right rectus rigidity (as in Henson's case), a not very critical examiner may perform an unnecessary operation.

It is well known that it is often difficult and sometimes impossible to distinguish, by signs and symptoms, between cholelithiasis and appendicitis. Also notorious is the frequent resemblance between appendiceal pain and right renal or, more especially, ureteral colic. The radiation of the pain, the superficiality or depth of the tenderness, the location of the Head zone, may serve, more or less, to distinguish them. The subjective phenomena are not always so easily to be set apart. Pollakiuria and dysuria are fairly frequently associated with appendicitis. What is much more apt to mislead, however, is the occasional occurrence of hematuria in appendicitis. This seems to be of two types, the first, by toxic, and the second, by physical irritation. Illustrating the first group, the writer has recorded a case of appendicitis, eventuating in suppuration, in which each attack exactly simulated a renal colic and was marked by the passage of bloody urine; and a case of ulcerative typhlo-appendicitis in which each seizure of pain and fever was accompanied by the appearance in the urine of many blood cells and granular casts. As an example of the second group, Seelig has put on record a remarkable case in which typical attacks of right-sided renal colic was accompanied by hematuria; radiographs showed a small shadow in the path of the right ureter near the brim of the bony pelvis; ureter catheters were obstructed at that level; at operation, the lesion was found, after a futile exploration of the ureter, to be a thickened appendix bound down upon that structure and containing an enterolith!

How often, if often, fever, right iliac pain and tenderness are due, not to appendicitis, but to "intestinal fermentation" (?), typhlitis or partial volvulus of a long-mesenteried cecum, it is quite impossible to say. It is safe to assert that the pain and tenderness at this site in young women are sometimes but the precursors or accompaniments of menstruation.

Thus far we have had in mind those cases in which there is no palpable mass. The presence of a swelling, however, may greatly simplify the diagnosis or add to its complexities—in other directions. An appendiceal mass must be differentiated from ileo-cecal tuberculosis, neoplasm and intussusception. An ovarian cyst may simulate the signs, and twisting of its pedicle the symptoms, of appendicitis with abscess. So, too, may the rarer inflammatory and neoplastic lesions of the omentum and mesentery. An appendiceal abscess often lies high enough, and a distended or omentum-wrapped gall-bladder low enough to confuse one with the other. A "perinephritic abscess" may prove to be a retrocecal appendiceal pus collection. A supposed sarcoma or osteomyelitis of the ilium may be of the same origin. If the mass is in the pelvis, in part or in whole, it may be, among other things, a salpingitis, ovarian abscess, impregnated tube or hematocele. In short, there is almost no (inflammatory) mass in the pelvis or the right side of the abdomen which may not be an appendiceal abscess.

Of diffuse purulent peritonitis, gangrenous appendicitis is the most common cause, but the rupture or perforation of any other hollow viscus (stomach, intestine, pus-tube) will cause about the same signs and symptoms. The differentiation of the provoking lesion is not very important, however, since the indication is in all cases the same.

When we pass from the acute to the chronic manifestations and simulations of appendicitis its vag-

aries multiply. The unnecessary removal of healthy appendices has long since become a standing topic for the comic papers. We believe, however, that the frequency has greatly diminished with which normal organs are sacrificed to too much surgical enthusiasm and too little clinical observation. Many of the patients unnecessarily appendicectomized belong to that unfortunate and unfortunately large class who suffer vague abdominal discomforts and pain and tenderness chiefly or also at McBurney's point (sometimes because of suggestion, sometimes very real). They are operated upon first "for" appendicitis, then "for" adhesions, then "for" something else—and always without any relief. These patients are all "neurasthenics," of course—if we mean by that term that we do not know what is the matter with them.

In part offsetting the instances of the removal of a healthy, where a diseased appendix was expected, are the converse occurrences—the finding of an unsuspectedly inflamed appendix. Widening experience affords fresh justification, in many cases, for the mistake of amputating an innocent vermiform member. There is a group of patients—merging symptomatically with the "neurasthenic" group above referred to—who suffer vague and irregular abdominal discomforts and pains, obstinate constipation, and a variety of symptoms of "chronic dyspepsia"; in some of these cases the underlying lesion ultimately proves to be a (congenitally or developmentally) misshapen or (and) inflamed appendix. (It is just in this group that one is most apt to find the Lane's kink of the ileum, the cecal membrane and the other peritoneal folds and bands concerning the significance or insignificance of which so much has been written. Incidentally, we would assert that the appendiceal "adhesions" so often and so glibly described are *usually* not adhesions at all, but folds of the mesenterioleum or, in acute cases, deposits of plastic exudate.

It seems to us not unlikely that some cases of dysmenorrhea may be due to chronic appendicitis.

The Mayos first taught, what all other adbominal surgeons have since observed, that pyloric spasm, and the symptoms associated with or arising from it, may be due, exclusively of other causes, to chronic appendicitis. We have learned that many cases of "hyperacidity" and other so-called functional gastric disorders are instances of unsuspected appendicitis. Many have come to doubt the invariability by which, according to Moynihan, duodenal ulcer can be postulated from the symptoms he describes. Cases have rapidly multiplied in which the classic symptoms of duodenal and gastric ulcer have been shown, at operation, to arise from cholecystitis or appendicitis. And just as, rarely, hematuria is produced by appendicitis so may that disease, rarely, be the only lesion found in cases in which gastro-intestinal hemorrhage completes the typical clinical picture of a supposed ulcer.

These sundry facts, many or all of them trite, are not merely interesting. They carry practical, albeit obvious, lessons:

In cases presenting the symptoms of appendicitis, the various other diseases that may cause those symptoms should be borne in mind. The incomplete list of them we have cursorily mentioned appears an imposing array, but a few minutes' observation of each case will indicate which, if any of them, needs to be seriously considered.

Conversely, in the presence of a doubtful mass in the pelvis or right abdomen, appendicitis abscess always deserves prominent thought.

In all cases of chronic, so-called functional gastric disturbance, in all the varieties of "chronic dyspepsia" and of obscure or atypical abdominal disorders, the possibility of a provoking appendicitis ought never to be overlooked. We would advise that every physician who undertakes the treatment of such a case should suggest to the patient that eventually his condition may prove to have an organic basis—perhaps an ulcer, perhaps gall-stones, perhaps appendicitis. Further, *we would urge the wisdom of frequently catechising such patients concerning their symptoms, and frequently submitting them to abdominal palpation.* In this wise, the physician may sooner or later establish a fair indication for surgical investigation. W. M. B.

A WEEK OF ABDOMINAL SURGERY.

This month will witness a unique surgical demonstration at Düsseldorf. Under the direction, and by invitation of Professors Witzel and Pankow, many of the European masters of abdominal and gynecologic surgery will gather in that city during the week of October 13th to 18th, there to demonstrate the particular operations or other procedures by which they are individually best known. Thus, Bassini will demonstrate his inguinal hernioplasty; Moynihan his operation for duodenal ulcer; Rovsing his treatment of splanchnoptosis, and gastroduodenoscopy; Molineus and Walther, appendicitis; Witzel, thrombosis and embolism; Zuckerkandl, kidney tumors; de Keating-Hart, fulguration; von Hacker, gastro-enterostomy, etc.

The other well-known surgeons who are programmed to participate are: D'Arcy Power, Bastianelli, Bumm, Burci, de Clairmont, Czerny, Depage, Franz. v. Franqué, Füth, Hackenbruch, Hartmann, Haudeck, Israel, Janssen, Jung, Theodor Kocher, Körte, Lanz, Lorthiroir, Madelung, Menge, Michael, Molineus, Mönckeberg, Opitz, Pankow, Poncet, Riedel, Schlimper, Schmieden, Sellheim, Sonnenburg, Sprengel, Stöckel, Tilmann, Walthard and Zangemeister.

Affording, as it does, an opportunity to see so many masters at work at one time and place, this "special course" is a clinical congress of a new and, we take it, excellent kind.

At the end of the week's course, for which an admission charge of 25 marks is to be made, Professors Witzel, Pankow, Janssen and other members of the Düsseldorf academy will hold special operative clinics, demonstrations of patients treated by mesothorium, radium and *x*-rays, etc. We shall await with much interest the reports of the doings of this notable gathering. W. M. B.

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

THE SURGEON AT SEA.

In considering fields of medical endeavor, insufficient attention has been given to the work of the ship's surgeon. As a general rule, the young physician recently graduated from his medical course, feeling desirous of an ocean voyage or some remunerative recreation, seeks to secure benefits by taking a position as a ship's doctor. In return for his technical training and service he is able to secure a trip either without compensation or with a very small emolument.

With the evolution of transatlantic liner to the huge proportions that are capable of accommodating entire villages, as far as population goes, it is but reasonable that ample provision should be made for medical attendance. The accident rate among employees of sea-going vessels is sufficiently high to warrant the employment of a surgeon by the company in order to give adequate attention to the crew. In addition to the men below decks, the large voyaging population requires some systematic plan for caring for its health during the period of transportation.

At the present time many of the larger steamship lines give a salary of fifty dollars a month to the ship's doctor, in addition to the opportunity of charging small fees to the passengers of the first and second class. On the larger vessels where the work required of the ship's surgeon is more onerous, the salaries vary from sixty to eighty-five dollars a month with many applicants seeking to fill the positions.

The entire question of ship sanitation should come within the purview of the chief medical officer of the large vessels. He should be a medical health officer as well as the ship's surgeon. If employed by the company, his services should be devoted to the interests of his employers in safeguarding the health of the crew and attending to their various ailments. As a supplementary vocation, he should be enabled to practice as occasion demands among the passengers of the first and second class, who may perchance require his professional service in either a medical or surgical capacity.

One frequently reads of the sudden operation which must be performed for the relief of a strangulated hernia or the removal of a diseased appendix, when the imagination of the reporter pictures the emergency operating room with the victim receiving an anesthetic at the hands of some volunteer passenger, probably a physician and possibly a layman. The assistants at the operation are recruited from among the passengers who chance to have a physician's degree. The operations are performed under stress and excitement and the fullest opportunity for recovery is afforded the patient insofar as a meager equipment and untrained operators can offer. This, to be sure, does not characterize the condition of all vessels, but it should not exist on any ship carrying the floating population which today is housed on our great trans-oceanic passenger vessels.

In the United States there is, on the average, one physician for every 568 persons, while in some of the smaller towns there may be two or three physicians to 300 inhabitants. This is somewhat suggestive of the ratio that exists in normal distributions of population. It is obvious that the nature of the traveling population is not as cosmopolitan nor as representative of all social strata as is a similar large group peacefully attending to normal occupations. It is patent, however, that to charge one physician on board a ship with a responsibility of caring for the physical health of 3,000 human beings, or even 5,000, is to supply inadequate medical service.

In order to establish the grade of ship's doctor as one worthy in dignity, honor and distinction, it is necessary to establish rigid requirements for this position. Only medical men who have secured a good technical training, followed by practical experience in a hospital, should be permitted to serve in this capacity. The position should not be designed to give recreation, even to the most deserving physician. It must be raised to the standards of service in the navy in order that it may become a worthy branch of professional life. The tendency of the time is to make the ship's surgeon a man of power and a valuable adjunct to the successful maintenance of health and comfort during voyaging. The story of the ship's surgeon has not been written. It is fraught with difficulties, but laden with opportunities. It requires judgment, discrimination and skill. It is a noble work, if it be well done.

THE AMERICAN MINE SAFETY ASSOCIATION.

In the organization of institutions for the promotion of safety, there has been a conscious effort to secure an active interest by the workers. The American Red Cross Society has been encouraging the formation of First Aid Corps in connection with various mines throughout the country. The results have been most valuable and suggestive of the advantage of securing the co-operation of miners in the plans for the safety and welfare of their fellow-workmen.

During September, the First Annual Meeting of the American Mine Safety Association was held at Pittsburg. It was founded by prominent men in the mining industry, who seek to establish into a National First Aid Association the numerous First Aid Corps already established. A Mine Rescue Corp also is to be established with a view to giving to the persons joining it a special training in the use of safety and electric hand lamps, artificial breathing apparatus, pulmotors and similar devices for promoting rescue work.

The further purposes of this Association to promote the safety of underground workers includes recommending the establishment of proper safeguards against accident, the approval of appliances and methods of procedure in safety inspection as well as mine rescue work and first aid treatment.

By placing stress upon the value of personal education, it aims to give the workmen information regarding these various subjects and desires to organize this into a National First Aid Corps similar to the St. John's Ambulance Corps of Great Britain.

The new association fills a place of its own. The mortality rate of the mining industry of this country is many times greater than that of foreign lands. Possibly other countries are protecting their citizens while a large proportion of American mine workers are merely foreigners whose lives are easily purchased and whose places are readily filled.

In the United States during the year 1911, there were 2,719 persons killed in the coal mines, while 9,106 were seriously injured and 22,228 slightly injured. This awful record has been practically duplicated by the deaths and injuries in metal mines and quarries. In recent years more men have been killed in mining in the United States per thousand men employed than in the mines of France, Belgium and Great Britain. The fatality rate per thousand men employed for France (1901-1905) was 0.91, for Belgium (1902-1906) 1.0, for Great Britain (1902-1906) 1.28, and for the United States (1902-1906) 3.39. Such distressing figures indicate the importance of all efforts to improve the safety of mines.

A considerable proportion of the wealth, comfort and health of the nation depends upon securing coal, iron and precious metals from the interior of the earth. It is only right that those engaged in the fundamental processes so essential to national prosperity should be safeguarded in every way possible, that they may live to enjoy the results of their conquests. The American Mine Safety Association merits encouragement, approbation and support.

Book Reviews

Lehrbuch der Praktischen Chirurgie fuer Aerzte und Studierende. Herausgegeben von DR. L. GELPKE, Privatdozent und Chefarzt des Kantonsspitals Baselland und DR. C. SCHLATTER, A.O., Professor der Chirurgie an der Universitaet Zuerich. *In two volumes.* 470 illustrations. Leipsig: JOHANN AMBROSIUS BARTH, 1913. Price $10.

With the collaboration of six other Swiss surgeons Gelpke and Schlatter have presented a very readable work on practical surgery. It is not intended to be exhaustive, nor are the opinions of other surgeons quoted to any extent. The authors give the conclusions reached from a study of their clinical material. These conclusions coincide, to a great extent, with the standard opinions now held on the various surgical conditions described, and one may therefore state that very little that is new is to be found in this book. The old, however, has been prepared carefully for the practicing physician (not for the specialist nor for the student interested in surgical pathology and the theoretical side of surgery), and he will find much in this text-book that will prove of practical value. Major operations are very briefly described; minor procedures, such as the operations for empyema thoracis, are described in great detail. Following the same general plan, the authors devote little space to the description of rare and complicated conditions, and enter fully into the symptoms and diagnosis of the commoner and the more important surgical ailments. For example, three pages are devoted to furunculosis of the external auditory canal.

Adverse criticism must be made of some of the opinions held by the authors. According to their statistics, they see very few cases of appendicitis; which may account for the statement that, theoretically, all patients should be operated upon early in acute attacks, but, practically, operation is not generally necessary early in the disease, and mild cases recover in a few days without subsequent recurrences (p. 594). Blind operations for the relief of strangulated hernia, with a full array of the old herniotomy knives, are described as if they were the standard operations for that condition. Similar, less important anachronisms are found here and there in the two volumes. Furthermore, the reviewer believes that the work of the Swiss surgeons would be enhanced if the studies of others were more extensively included.

Many of the illustrations are original. Most of these are excellent, especially those in the sections of the surgery of the extremities, where they are very profuse.

A Manual of Surgery for Students and Physicians. By FRANCIS T. STEWART, M.D., Professor of Clinical Surgery, Jefferson Medical College; Surgeon to the Germantown Hospital, etc. *Third edition.* Octavo; 742 pages; 571 illustrations. Philadelphia: P. BLAKISTON'S SON & Co., 1913. Price $4.00.

Despite the fact that this, the third edition, has followed the previous one in a very short time, the author has found it necessary to make a number of important additions to the text to keep it up to date. In this effort Stewart has been very successful. His book is one of the best of the small manuals of surgery, from the viewpoint of practical information compactly and clearly presented to students and general practitioners. It is not intended for the specialist. The illustrations that are borrowed have been chosen with great care, and the original ones are equally well selected. Our chief adverse criticism of Stewart's manual is the extreme condensation of many important surgical conditions and procedures.

The Modern Treatment of Nervous and Mental Diseases. By American and British authors. Edited by WILLIAM A. WHITE, M.D., Superintendent of the Government Hospital for the Insane, Washington, D. C.; Professor of Nervous and Mental Diseases in the Georgetown University; Professor of Nervous and Mental Diseases in the George Washington University; Lecturer on Mental Diseases in the U. S. Army and U. S. Navy Medical School, Washington, D. C., and SMITH ELY JELLIFFE, A.M., M.D., Ph.D., Adjunct Professor of Diseases of the Mind and Nervous System in the N. Y. Post-Graduate Medical School and Hospital; Visiting Neurologist to the City Hospital; Consulting Neurologist to the Manhattan State Hospital, New York, N. Y. *Volume II;* octavo;; 816 pages; illustrated. Philadelphia and New York: LEA & FEBIGER, 1913.

The following chapters are included in this volume: The Treatment of the Neuralgias and Neuritides, by SIDNEY I. SCHWAB; The Treatment of Injuries to the Peripheral Nerves, by JAMES SHERREN; The Treatment of the Muscular Atrophies and Dystrophies, by ISADOR ABRAHAMSON; The Treatment of Headaches, by SMITH ELY JELLIFFE; The Treatment of Spasmodic Disorders, by HERMAN H. HOPPE; The Treatment of the Epilepsies, by J. F. MUNSON; The Treatment of the Meningitides, by WILLIAM J. M. A. MALONEY; The Treatment of the Syphilitic Diseases of the Nervous System, by SMITH ELY JELLIFFE; The Treatment of Cerebral Hemorrhage, Embolism and Thrombosis, by FREDERICK TILNEY; The Treatment of Disorders of Expression (Aphasia, Apraxia, etc.), by S. A. KINNIER WILSON; The Treatment of Stuttering, by E. W. SCRIPTURE; The Treatment of the Cranial Nerves and Organic Lesions of the Spinal Cord, by COLIN K. RUSSEL; Diseases of the Optic Thalamus, Midbrain and Cerebellum and Their Treatment, by GORDON HOLMES; Paralysis Agi-

tans and Multiple Sclerosis and Their Treatment, by CARL D. CAMP; The Treatment of the Toxemias of Dangerous Trades and of Drugs, by LOUIS CASAMAJOR; Surgery of the Brain and Spinal Cord, by ALBERT E. HALSTEAD and ROGER T. VAUGHAN.

The second volume maintains the high standard of the first, which was reviewed in the *American Journal of Surgery* August, 1913. The articles are of uniform excellence and reflect credit upon both the authors and the editors.

A Text-Book of Biology for students in Medical, Technical and General Courses, by WILLIAM MARTIN SMALLWOOD, Ph.D. (Harvard), Professor of Comparative Anatomy in the Liberal Arts College of Syracuse University; in charge of Forest Zoology in the New York State College of Forestry at Syracuse. Octavo; 285 pages; 243 engravings and 13 plates in colors and monochrome. Philadelphia and New York: LEA & FEBIGER, 1913.

This work appeals to the physician not only because biology as a whole should form a part of the culture of every physician, but also because certain special portions of the subject are of direct practical importance to him. We refer especially to the chapters on protozoa, on bacteria, yeasts and molds; the worms; insects; biological factors in disease; evolution; and heredity. The author has a clear didactic style that affords pleasant reading. The chapters affecting medicine directly leave nothing to be desired in the way of adequacy of exposition and command of the subject. Especially clear and interesting are the chapters on heredity and evolution. The illustrations are well chosen and well executed.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia; assisted by LEIGHTON F. APPLEMAN, M.D., Instructor in Therapeutics, Jefferson Medical College. June 1, 1913. Philadelphia and New York: LEA AND FEBIGER. Price $6.00 per annum.

The subjects included in this volume are surgery of the abdomen, hernia, gynecology, diseases of the blood, metabolic diseases, diseases of the spleen, thyroid gland and lymphatics, and ophthalmology. The advances made in abdominal surgery are reviewed critically by J. Gerster. Clark's résumé of advances in gynecology center around a careful analytical study of uterine cancer. The study of the medical affections, made by Stengel, is very exhaustive, especially in reference to the thyroid gland. Jackson's contribution, referring to advances made in ophthalmology, is a brief one.

Genitourinary Diagnosis and Therapy for Urologists and General Practitioners. By ERNST PORTNER, M.D. Translated and edited by BRANSFORD LEWIS, M.D., B.Sc., Professor of Genitourinary Surgery, Medical Department of St. Louis University; Genitourinary Surgeon to St. John's Hospital and Frisco Hospital, etc., etc. Small octavo; 221 pages; 43 illustrations. St. Louis: C. T. MOSBY COMPANY, 1913.

The title of this small book is rather misleading. Genitourinary diagnosis occupies a position of very secondary importance, the authors taking for granted a full knowledge of the symptoms, pathology, and methods of diagnosis of the various genitourinary diseases. Nor is it a work intended for urologists, inasmuch as many of the refinements of treatment, many of the instruments of precision, are completely omitted. It is a book that should prove of considerable value to the practitioner who desires knowledge of the non-operative treatment of genitourinary diseases. The subject matter is tersely presented, and the author's conclusions are evidently derived from a critical analysis of a large clinical material.

Progress in Surgery

A Résumé of Recent Literature.

The Iodine Treatment of Gonorrhea in the Female. O. HOFMANN, Kansas City. *Interstate Medical Journal*, August, 1913.

Excellent results are described by Hofmann in the treatment of both the acute and chronic forms of the disease. Dilute solutions of idoine are employed. Direct application must be made to Skene's ducts, the Bartholinian ducts, and the vaginal walls. The cervix and the interior of the uterus should be treated by iodine applications and instillations only when they are proven infected. Direct treatment of the urethra is rarely indicated. Hofmann does not believe that curettage should be performed when the endometrium is the seat of an active gonorrheal inflammation. He reserves that operation for the time when "the condition has, so to speak, reverted into a simple chronic hypertrophic or fungous endometritis."

The Use of a Conjunctival Flap in the Treatment of Corneal Infections and of Pannus. ELMER G. STARR, Buffalo. *Annals of Ophthalmology*, July, 1913.

An experience of several years with the operation leads the writer to conclude that it far outranks the actual cautery in the treatment of grave corneal lesions. The bulbar conjunctiva is dissected free close to the corneal margin for a distance sufficient to insure complete covering of all ulcerated parts, and two lateral incisions are carried well back on the eyeball in order to fashion a flap. With the type of ulcer under consideration, the entire cornea must generally be covered. The flap of conjunctiva is therefore drawn over the cornea and is sutured to the conjunctiva on the opposite side. Not infrequently two flaps of conjunctiva must be made and sutured over the cornea, owing to inflammatory changes in the conjunctiva itself.

As the conjunctival sutures loosen or are removed, the flaps gradually retract or remain in part adherent to the most extensively diseased part of the cornea. In the latter instance the membrane is at first vascular, but generally is quite thin in the final stages of repair. In the former instance the ulcer shows a clean healing surface as the flaps retract. The suturing must be repeated not infrequently when the flap separates too soon.

The operation is of great value in the treatment of pannus. After the vascular tissue has been scraped off the cornea until the latter is clear, the conjunctival flap is made as above described.

On the Pathogenesis of Salvarsan Fatalities. W. WECHSELMANN, Berlin. *The Urologic and Cutaneous Review*, July, 1913.

This number of the *Review* contains the concluding instalment of Wechselmann's paper. He points out the extreme difficulty in the interpretation of salvarsan fatalities, owing to the fact that these have largely occurred in the hands of those not adhering strictly to the laws that have been laid down for the administration of salvarsan. "Salvarsan *per se* employed in normal persons in the customary dosage is non-toxic. Any evil consequence observed is always due to some organic insufficiency, especially of the kidneys." Wechselmann concludes his paper by tabulating the precautions to be taken in the administration of the drug, his conclusions being based upon the treatment employed in more than 25,000 cases:

1. The most exact technique.
2. A dose of the drug carefully adapted to the individual case.
3. Careful observation of the urinary secretion when employing salvarsan; resorting to the most exact chemical and microscopical examination of the urine. *This holds good particularly when the combined treatment is employed.*
4. The conjoint use of salvarsan with heavy mercurial

The Technique of Pyloric Exclusion. *(Zur Technik der Pylorusausschaltung)* E. Palya, Budapest, *Zentralblatt für Chirurgie,* August 23, 1913.

Investigation and observation have shown that occlusion of the pylorus can only be assured when the pylorus is tied by a transplanted connective tissue bundle. Wilms recommended using a strand of the aponeurosis of the rectus muscle. Palya believes that the edge of the suspensory ligament of the liver is better adapted for this purpose and has employed it in seven cases with satisfactory results. In two fatal cases the closure was found to be complete and the ligament firmly healed in situ. The technique consists in isolating a portion of the free edge of the suspensory ligament for a distance of five to six centimeters. The ligament is then tied around the pylorus and the knot fixed with one or two catgut sutures.

The Influence of Copper Upon the Growth of Mouse Carcinoma. A. J. Gelaire, Liverpool, *British Medical Journal,* August 2, 1913.

In a series of 48 tumor mice, Gelaire injected subcutaneously copper in the form of copraammonium sulphate or colloidal copper. With copraammonium sulphate the number of complete disappearances was 25 per cent.; with colloidal copper the percentage was 6.3 per cent.; about half the tumors remained stationary. Gelaire believes the results are sufficiently encouraging to warrant the trial of such injections in human beings.

Arsenic Cancer. H. H. Nutt, J. M. Beattie and R. J. Pye Smith, Sheffield, *Lancet,* July 26, 1913, and August 2, 1913.

The authors describe the case of a woman, twenty-nine years of age, who in the course of observation extending over a period of about a year and a half developed ulcers on various parts of the body, the hand, pubis and the vulva. These ulcers examined pathologically were epitheliomatous and were removed surgically in various ways, by amputation, wide incision, *x*-rays and carbon dioxide snow. Finally the patient succumbed to what apparently seemed to be an intrathoracic new growth. In addition to these ulcers there were keratoses over the palms and soles and various thickenings and warty excrescences all over the body. The history revealed that the patient had taken arsenic continuously between the ages of seven and fourteen. She had not taken any since. The authors have extracted thirty similar cases from the literature and give an excellent résumé of the subject.

Ether Washing in Perforation Peritonitis. *(Ätherspülung bei Perforations Peritonitis.)* F. Derganc, Lanbach, *Wiener Klinische Wochenschrift,* August 14, 1913.

Derganc reports two cases (1, peritonitis following ruptured gastric ulcer; 2, peritonitis following intestinal perforation) in which this method, first described by Morestin, appears to have been of marked benefit. After cleansing away as much of the pus, fibrin and intestinal contents as possible, a large quantity of ether (150 to 400 g.) are poured into the abdomen and quickly mopped up. After drainage the abdomen is closed. The author summarizes the reports of Morestin and others who speak highly of this method. It is especially useful in perforation peritonitis arising from appendicitis, ruptured pyosalpinx, etc. Derganc does not describe the raison d'être of the method, but all authors are convinced of its harmlessness.

Angioma of the Urethra as a Cause of Severe Hemorrhage. *(Angiom Der Harnröhreals Ursache heftiger Blutung.)* A. Wolf. Leinberg, *Wiener Klinische Wochenschrift,* August 21, 1913.

A young man had bled continuously from the urethra for eight days. There was no history of venereal infection. The blood dripped continuously from the meatus; the urine obtained by catheter was free. With the endoscope Wolf saw a small angioma six centimeters from the meatus. The tumor was destroyed by the galvanocautery with eventual cure.

Operation for Varicose Veins Through the Smallest Incision. *(Operation der Varicen Mit Kleinsten Schnitten.)* Dr. Holfreder, *Zentralblatt für Chirurgie,* August 16, 1913.

In the standing position the most prominent varices on the lower extremity are first marked with methylene blue. After disinfection of the skin about six to ten incisions, each one to two centimeters long, are made at various points over the veins. Through each incision the vein is cleanly isolated from the surrounding tissue and divided between two clamps. Each clamp is then twisted a number of times and as much as possible of the vein is torn out. The author has obtained specimens even as long as 80 centimeters by this method. When the saphenous vein is unusually prominent the vein is tied proximally. After closure of the incisions a firm dressing over the limb is applied. The author has never seen hemorrhage or thrombosis after operation.

Retrocalcaneal Bursitis. C. S. White, Washington, D. C. *New York Medical Journal,* August 9, 1913.

This uncommon malady is sometimes known as Albert's disease. The cause is either acute or chronic, such as ill-fitting shoes, excessive walking, bicycle riding and certain occupations which tend to produce pressure at this point. There occurs a hyperplasia of the capsule and increase in secretion, sometimes even pus, in the bursa situated between the os calcis and the tendo Achilles. White describes the anatomy of the bursa in detail. The symptoms are pain, aggravated by walking, relieved by rest in bed. The gait of such patients is characteristic, the patient keeping his feet in plantar flexion, because dorsal flexion is painful. This affection has a tendency to become chronic. The best treatment is removal of the bursa. White describes one case.

The Cure of Cancer by Means of Exploratory Curettage. *(Heilung von Karzinom durch Probeauskratzung.)* C. H. Stratz, *Zentralblatt für Gynäkologie,* No. 31, 1913.

Stratz calls attention to the occasional possibility of removing by the curette used for purposes of diagnosis, the entire carcinoma-bearing area. The uterus of such a case was subsequently removed and found to contain not the slightest trace of cancer. At the same time it is to be regarded rather in the light of a scientific curiosity and not as a practical method of radically curing cancer of the womb.

A Contribution to the Power of Resistance of the Peritoneum and to Suture of the Uterus Following Caesarian Section. (Executed by the patient herself.) *(Ein Beitrag zur Widerstandskraft des Peritoneums und der Uterusnaht nach Sectio Caesaria.) (von der Patientin selbst Ausgeführt.)* Rudolf Patek, *Zentralblatt für Gynäkologie,* No. 30, 1913.

Patek draws attention to the resistance power possessed by the peritoneum as exemplified in a case of self-performed Cæsarian section. The patient was 19 years old, who wished to commit suicide because of the disgrace of an illegitimate conception. At the onset of labor she prepared a wash-tub full of water into which she entered and then cut open her abdomen with a sharp razor belonging to her father. Unconsciousness followed. The woman was found some hours afterwards in this condition and brought to the hospital. The intestines were prolapsed, the uterus was firm, although still containing placental rests. The child had meanwhile died of asphyxia. The patient made a satisfactory recovery, was discharged from the hospital at the end of eight weeks. Subsequently she married, became pregnant and was delivered in due time spontaneously of a boy. In spite of the unusual exposure to the penetrating unaseptic razor, and also to the tub-water, the peritoneum was able to resist fatal infection.

treatment is dangerous! If one will use the combined treatment, then give mercury very carefully many days after the last salvarsan injection, but never reverse this rule!

5. Take into careful consideration every general reaction or rise of temperature, following the use of salvarsan, and make a full investigation of the causes of such effect.

The Determination of the Level of Good Circulation in Gangrene of the Foot. (*Zur Bestimmung der Ernaehrungsgrenze bei Gangraena Pedis.*) W. SANDROCK, Leipsig. *Zentralblatt fuer Chirurgie*, No. 27, 1913.

The more or less complicated methods of Moszkowitz, Klapp and others employed to estimate the level at which amputation should be done are not discussed by the author. He describes an observation made when the leg of a patient was being cleansed for operation. The skin becomes diffusely red in the well-nourished portion and this flush stops more or less abruptly at the poorly nourished level. When the change is less abrupt the transition zone shows either spotted or streaky redness. Amputation is performed at the margin of the healthy zone. In none of the cases of diabetic or arteriosclerotic gangrene in which amputation was performed according to this rule was a reamputation necessary.

The healthy limbs, in these cases, were scrubbed in order to control the observations. The difference was always distinct. It is occasionally necessary to wait a minute until the reactive hyperemia appears; it sometimes disappears very quickly.

The Significance of Renal Hematuria Immediately Following Nephrectomy for Tuberculosis. (*De La Valeur de l'Hematurie Rénale Immédiatement Consécutive a Une Nephrectomie Pour Tuberculose.*) M. PENA, Paris. *Journal d' Urologie Médicale et Chirurgicale*, July 15, 1913.

A number of cases of hematuria directly following nephrectomy have demonstrated that the remaining kidney may be the source of the bleeding. The author analyses the material in a personally observed instance and analyses the results of 22 cases that have been reported to him. He does not believe that congestive reaction and compensatory hypertrophy account for the hematuria. The latter reveals, in some instances, minute foci of tuberculosis in the remaining kidney, areas that could not be demonstrated before the operation by the generally employed methods of examination. In other cases the post-operative hematuria is due to a non-tuberculous infection of the remaining kidney. When infection of the kidney cannot be proven to be the cause of the bleeding, the author assumes the presence of a hemorrhagic nephritis. In any event, the prognosis should be very guarded.

Renal Varix and Hyperemia as Causes of Symptomless Renal Hematuria. DAVID NEWMAN, Glasgow. *The British Journal of Surgery*, July, 1913.

Bleeding from healthy kidneys does not occur. Section of the living organ or even careful microscopical examination will not always reveal the slight lesion or the hyperemia that has been the cause of the renal hematuria. In the cases described by Newman the only indication of illness was the presence of blood in the urine; *x*-ray examination, examination of the urine for other constituents than blood, palpation of the kidneys, etc., were all negative.

The larger class of painless hematuriæ (from tumor, tuberculosis, ureteral stone, etc., etc) should be differentiated from symptomless hematuria, the subject of this paper. The only cases that can now be properly included under the latter heading are: 1. Renal varix. 2. Passive hyperemia from pressure on, or torsion of, the renal veins. 3. Small growths in the pelvis of the kidney.

Renal varix is a distinct pathological entity. This history is generally one of the discovery of blood in the urine by a patient in good health. At first the amount of blood is small and lasts for a few days or only a few hours; subsequently the urine becomes loaded with blood. Rest or exercise does not influence the amount of blood. Cystoscopic examination shows a blood-stained but normal bladder and, if the hematuria is active, shoots of bright blood are seen escaping from the ureter of the affected kidney. The only treatment for the condition that is advocated by Newman is operation. Nephrotomy with excision of the varices may result in cure, but most of the reported cases have required nephrectomy.

The pathological and clinical relationship of passive hyperemia from pressure on, or torsion of, the renal vein, to the previous group, is a very close one. Displacement or abnormal mobility of the kidney is the usual cause of the passive hyperemia, and the author believes that renal varix would have been frequently discovered if the renal pelvis had been opened at the time of the operation (nephrorrhaphy). When torsion of the renal pedicle is the cause of the hyperemia, rest in bed may stop the bleeding for a time and the relief may be permanent if the rest be prolonged and the kidney settles back to its normal position. Operation must generally be resorted to, however, in the severer cases. Decapsulation and fixation of the kidney in the normal position may be sufficient; splitting of the kidney may be necessary, however.

Comparative Studies of the Reinforcing Power of Free Omental, Mensenterial, and Peritoneal Transplants for Intestinal Sutines. (*Vergleichende Studien Ueber den Nahtverstaerkungswert des Ungestielten Netz, Peritoneal und Mesenteriallapens.*) J. SASAKI, Japan. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 123, Parts I and II.

In the experiments performed, similar technic was employed for the omental, peritoneal and mesenterial transplantation. The latter was done by removing the mesenterial peritoneum from a loop of intestine a considerable distance from the region where the intestinal sutures were passed; the gap in the mesentery was carefully closed. The peritoneal transplants were removed from the edge of the abdominal incision. Omental grafts were taken from the lower border of that structure. Resections, lateral anastomoses, etc., were the operations performed (all on dogs), and the suture lines were intentionally weakened at all these operations.

The reinforcing power of mesenterial and peritoneal transplants was very pronounced; omental transplants proved very unsatisfactory. Sasaki finds the reason for this difference in the results largely dependent on the elastic fibres in the flaps. Elastic fibres are very scanty in the omentum, numerous in the peritoneum flaps. It was also observed that strictures, adhesions, etc., occurred where omentum had been grafted over suture lines, but that complications were uncommon with peritoneum or mesentery flaps.

Concerning the healing of transplants, the most important requirement is the contact of transplant with the intestinal serosa at the suture line. If this occurs, the contact surfaces develop a very firm scar-tissue. A living graft is essential to good healing; Sasaki's best results have therefore been obtained in autoplastics.

Based on his experimental work, the author concludes that peritoneal or mesenterial transplants should be employed to reinforce suture lines in gastric or intestinal operations when there is undue tension upon those suture lines or when undue tension is expected to occur postoperatively.

Concerning Spontaneous Healing of Wounds of the Lungs. (*Neber Spontanheilung von Lungenwunden.*) M. TIEGEL, Dortmund. *Archiv fuer Klinische Chirurgie*, Vol. 101, Part IV.

Even from a very conservative viewpoint three indications for thoracotomy for wounds of the lung are laid down: 1. Active bleeding. 2. Pneumothorax with great tension. 3. Progressive, generalized subcutaneous emphysema, involving the mediastinum as well. Tiegel believes, however, that this conservative viewpoint is far too radical, especially in the types of operations performed for the three conditions enumerated. He points out that active

bleeding is uncontrollable with the operations at present performed therefor; furthermore, the patients are in very poor physical condition and do not stand a major surgical procedure.

A number of experiments are reported in which deliberate wounds of pulmonary lobes were inflicted. It was very surprising to observe how often these wounds healed spontaneously. Tiegel therefore believes that cases of the first group should not be operated upon.

Cases of the second group should be operated upon, but a search for the tear in the lung should not be instituted Tiegel believes that the best results are obtainable by performing a simple thoracotomy and inserting a tube connected with a valve drainage apparatus.

A striking case is reported in which a very simple procedure cured an example of the third group. The patient was suffering from rapidly progressive traumatic subcutaneous and mediastinal emphysema. An exploration of the lung was decided upon, but the patient's condition became too poor to permit it. Tiegel then determined upon the following: Without anesthesia, a small supraclavicular incision was made and carried through the fascia. The finger inserted dissected up the tissues, until the tracheal wall was reached. A suction apparatus was attached. Air escaped from the wound in a continuous stream. Difficulty in breathing was thereby rapidly relieved. Subsequently a valve drainage of the plura was established in order to relieve the intrathoracic tension. The patient made a smooth recovery.

Two Cases of Nasopharyngeal Polypus in Young Persons Mistaken and Operated Upon for Adenoids. W. R. BUTT, M.D., Philadelphia, Pa. *The Pennsylvania Medical Journal*, August, 1913.

Two cases are reported, the first in a boy of 16 years, the second in a boy of 6 years. Both gave history of nasal discharge and mouth breathing similar to that occurring in children with adenoids. In both cases the large mass was removed, but it recurred in both cases. The growths originate in the nose and extend backward into the pharynx. The appearance of the tumors was in part similar to that of nasal polypi, in other parts it appeared to be denser and more fibrous. The second case showed nervous symptoms and choreic movements, which the author has found reported also in two other cases of pharyngeal polypi. The differential diagnosis from fibroma of the naso pharynx is important since these tumors give rise to considerable technical difficulty at operation, owing to their great tendency to bleed.

Some Fallacies Regarding the Treatment of Tuberculous Adenitis. JOHN H. JOPSON, M.D., Philadelphia, Pa. *Archives of Pediatrics*, August, 1913.

In this article, Jopson argues in favor of radical surgical treatment of tuberculous cervical adenitis. The portal of entry of the tubercle bacillus is frequently unknown, and the organ through which it enters apparently shows no tuberculosis, and it is therefore logical to treat the adenitis as a primary tuberculous focus. As such the proper treatment is radical surgical removal. "If one can, by carefully planned and deliberately executed operation, thoroughly remove a primary lesion, it would seem unnecessary to invoke the other agencies such as the *x*-rays and tuberculin, and to substitute them for a rapid and complete surgical removal." The statistics of Dowd in a study of several hundred cases show that 70 to 90 per cent of the cases are cured, whereas only 24 per cent recover without operation.

On the Effect of Scarlet Red in the Treatment of Gastric and Duodenal Ulcer. JULIUS FRIEDENWALD and T. F. LEITZ, Baltimore. *Monthly Cyclopedia and Medical Bulletin*, June, 1913.

The authors report their results in 37 cases of gastric and duodenal ulcer treated by means of scarlet red given by mouth. The rationale of this treatment was first investigated by J. S. Davis, who showed, in 1912, that scarlet red had a healing influence on experimentally produced ulcers in the stomachs of animals.

Friedenwald and Leitz advise administering the drug in 15 to 20 grain doses, three or four times daily before meals. Even in much larger doses, no toxic effect was ever observed. In the largest proportion of cases in which it was used, a most beneficial effect seems to have been obtained. Only such cases were chosen as did not improve with the ordinary rest and diet cures. The authors conclude:

1. Scarlet red is a useful adjuvant in the treatment of peptic ulcer.
2. While it cannot replace the usual form of treatment, when it is administered with them, it frequently renders the cure more effective.
3. As a help in the treatment of ambulatory cases, it is of great service and its effect seems to be even more favorable than that obtained from bismuth.
4. Its use need not in any way interfere with the use of other remedies administered at the same time.

Hexamethylenamin in the Treatment of Infection in the Bowel and Bile Tract and to Prevent Post-Operative Tympany. G. P. LA ROQUE, Richmond, Va. *Therapeutic Gazette*, July 15, 1913.

La Roque concludes from a study of a large number of cases that hexamethylenamin is of distinct use in preventing the accumulation of intestinal gases. The drug is particularly useful in post-operative conditions and according to the author should be used as a regular routine in operations on the digestive tract. The procedure outlined is the following:

When practicable ten grains of hexamethylenamin dissolved in a glassful of water are administered every two hours between meals while the patient is awake for two days previous to operation. The evening before or morning of operation the usual bowel cleansing by castor oil and enema is done. Immediately after operation the nurse dissolves one hundred and twenty grains of hexamethylenamin in a quart of ordinary drinking water, usually without ice, and as soon as the patient complains of thirst small quantities of this are given at a time, the quantity being cautiously increased as the stomach becomes retentive. In this way the patient usually takes and retains at least a quart of water containing one hundred and twenty grains of the tasteless drug during the first twelve to twenty-four hours. By this time they can commonly retain a glassful of water at a time, and ten grains of hexamethylenamin dissolved in a tumblerful of water are administered every two hours until between sixty and one hundred and twenty grains are administered each twenty-four hours, for seventy-two hours after operation. At the end of this time the drug is discontinued and the usual post-operative bowel cleansing is performed.

Prognosis and Treatment of Compound Fracture of the Base of the Skull. A. C. BURNHAM, New York. *Boston Medical and Surgical Journal*, August 21, 1913.

Of 35 cases observed in the New York Presbyterian Hospital there was a mortality of 40 per cent. Cases with bleeding of the nose are more fatal than those in which there is a discharge of cerebro-spinal fluid from the ear, due probably, to the greater risk of infection. Phelps has noted that cases in which the temperature is over 102 degrees Fahr. on admission, or in which the temperature reaches 105 degrees Fahr. are nearly always fatal. In one of the author's series a patient recovered despite this temperature. A high leucocyte count is of bad prognostic import. Of 29 cases living more than 48 hours, 31 per cent developed meningitis; of these four recovered. Compound fracture of the base of the skull is less fatal in early life than in middle or old age. The treatment of this form of fracture consists in measures directed against shock; stimulation, and disinfection of the nose and ear, preferably with iodine. Irrigations, however, should not be used. Burnham recommends hexamethylenamine in large doses. Four of the author's cases were operated upon; one recovered.